

MARXIST DIALECTICS TODAY

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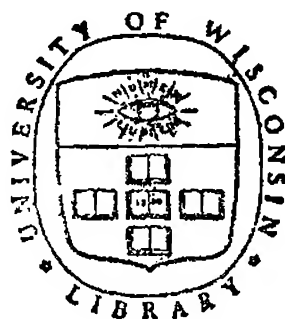
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PRESENT-DAY PROBLEMS OF THE THEORY OF
MATERIALIST DIALECTICS*

There is need for ever greater attention to various aspects of the further development of Marxist-Leninist theory in view of the grand processes taking place in the world: the involvement of the peoples in the active making of history, the progress of the world socialist system in building a new society, the consolidation of the peace-loving forces in the struggle for international detente, and the unfolding of scientific and technical revolution. It was stressed at the 24th Congress of the CPSU that a forward-looking revolutionary theory was the only basis for forecasting the course of complex processes in our day and formulating in scientific terms the strategy and tactics of the Communist Parties in the struggle for socialism and communism. The Marxist-Leninist doctrine, with materialist dialectics as its integral part, being developed by the collective efforts of the Communist Parties and the Marxists of all countries, provides an invaluable instrument for the scientific solution of the new problems arising from social development and the advance of modern scientific knowledge.

The exceptional importance attached by the founders of Marxism-Leninism to materialist dialectics as the central element of Marxist scientific views is well known. At every stage of their activity, Marx, Engels and Lenin constantly

* Editorial article in the journal Voprosy filosofii (Problems of Philosophy), No.6, 1972.

looked to materialist dialectics, which they regarded as a theoretical instrument that is to make human thought flexible and mobile. They believed Marxist science was creative because of its method, and regarded dialectics as that "restless" element in Marxism which kept advancing it and maintaining the link-up between theory and social and scientific practice. Lenin said dialectics was the soul of Marxism, the most profound and comprehensive theory of the development of natural and social reality, the taproot which gives Marxist theory its creative and critical revolutionary spirit, the spirit of indomitable and ceaseless advance. He regarded it as the earnest of successful solution of the most complicated political and socio-economic problems arising in the historical process. It is quite natural that just before and as he was formulating the theory of imperialism, which equipped the Communist Party with a clear understanding of the specifics of the new epoch and which helped it to formulate the correct political line that led to the triumph of the October Revolution, Lenin made a special study of the problems of dialectics.

The organic connection between the creative character of Marxism-Leninism and its method, and the latter's tremendous role in creating Marxism's integrated and coherent system of views on the development of natural and social reality and on the regularities of its cognition explain why the Marxist-Leninist parties and Marxist philosophers have always concentrated on the problems of materialist dialectics. The present historical epoch shows most clearly the intricate dialectical nature of the historical process and the development of scientific cognition, enhancing the role and importance of materialist dialectics in social life and in every sphere of science and culture.

A beneficial effect has been exerted on the development of materialist dialectics, as on the whole of Marxist-Leninist philosophical science, by the historic decisions of the CPSU and the policy documents of the international communist and workers' movement. The resolution of the CPSU

Central Committee "On Measures for Further Developing the Social Sciences and Enhancing Their Role in Communist Construction" and the decisions of the 24th Congress of the CPSU have outlined the prospects for the further consolidation of the ties between Marxist-Leninist theory and socio-historical practice. These documents forcefully emphasise the role played by Marxist-Leninist theory in the solution of the vital tasks of the world revolutionary process, the construction of socialism and communism, and the development of present-day scientific knowledge. Orientation upon the tackling of urgent problems of historical practice and scientific cognition, with a simultaneous overcoming of the elements of the scholastic and commentatory approach to the formulation and elaboration of fundamental problems in Marxist philosophical science, and consistent implementation of the principle of Party commitment in the sphere of philosophical thought and resolute struggle against every type of ideological adversary of Marxism have raised research in the field of dialectical materialism to the level of the requirements made on us by modern scientific and social practice.

The level of research in the sphere of dialectical materialism has risen substantially, with successful efforts being made to enrich and extend the range of problems and the system of categories in materialist dialectics. Soviet philosophers have published a number of important works analysing many fundamental problems of dialectics as a philosophical science (the method of ascent from the abstract to the concrete, the relationship between the logical and the historical mode of research, the dialectic of structuring theoretical systems, etc.). Almost every one of the fundamental categories of materialist dialectics has become the subject of monographic studies. Special mention should be made of the important results achieved in studying categories like "dialectical contradiction," "quantity-quality," "form-content," "part-whole," "thing-property-relation." There was intensive discussion of the principles for struc-

turing a system of dialectical categories, and different variants of such a system have been produced. In some books an attempt has been made at giving a systematic exposition of the problems of dialectical logic.

An important role in elaborating the problems of the theory of materialist dialectics has been played by the study of the theoretical legacy of the founders of dialectical materialism. The study of the problems of dialectics in the works by the Marxist classics (above all Capital, Materialism and Empirio-Criticism, and Philosophical Notebooks), and the writing of works dealing specially with the history of Marxist dialectics were not only an advance in the study of the history and development of the philosophy of Marxism but also helped to bring out the present-day problems of dialectics.

In fulfilment of Lenin's precept, philosophers made a comprehensive analysis of the dialectical methodology of Marx's Capital. An especially great contribution to this analysis has been made by Soviet scientists. Their analysis of the dialectical structure of Capital has enabled them to produce a full-scale formulation of the problems which have a direct bearing on the requirements of modern science, like the elaboration of the methodology of research into integral formations, the problem of the relationship between the diachronic and the synchronic in theoretical research, and the specifics of mastering reality by means of scientific theory. The study by Soviet philosophers of Lenin's classical works--Materialism and Empirio-Criticism and Philosophical Notebooks--and especially their comprehension of Lenin's proposition concerning the identity of dialectics, logics and the theory of knowledge in the philosophy of Marxism have proved to be exceptionally fruitful.

There has been intensive and fruitful work, in the light of materialist dialectics, on theoretico-epistemological and methodological problems in present-day scientific knowledge: the structure and typology of scientific theories,

the relationship between the theoretical and empirical levels of scientific research, the logic of the formation and development of scientific concepts, the nature and structure of various methods in scientific research, etc. Considerable research has been done into the prerequisites and mechanisms of the formation of new knowledge in science, into the establishment of the regularities in process of correlating theory with objective reality, and into the role of practice in knowledge. In studying the specific features of the development of scientific knowledge and analysing the logical structure of scientific research and the ways of its display in the contest of scientific discoveries, Soviet philosophers proceed from Lenin's idea of the fundamental unity of the characteristics of being, i.e., objective reality and the process of cognition of this reality. In view of this specific feature of Marxist philosophy, Soviet scientists have devoted considerable attention to developing and concretising, on the strength of data from modern science, the dialectico-materialist theory of the structure and properties of matter. There has been detailed consideration of such general principles of materialist dialectics as the principle of the inexhaustibility of matter, the material unity of the world, and the principles of development and determinism. Positive changes are also in evidence in the elaboration of dialectics as the methodological basis of the social sciences. A number of works have been published to show the dialectic of the historical process, the objective logic of social development and the methodological questions of social cognition.

These achievements of Soviet philosophers provide the basis which makes possible further progress in elaborating dialectics as a philosophical science.

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Let us now turn to the elaboration of the theory of materialist dialectics as a coherent philosophical system with the unity of its ideological and methodological aspects.

This implies, in particular, the production of generalising works summing up what has been done by Soviet philosophers in elaborating the whole complex of problems in materialist dialectics. The task of producing a generalised picture characterising the categorial system of present-day scientific thought, the dialectic of present-day social change is pressing and important, and the state of research in this field makes it possible to raise the task.

The effort to structure materialist dialectics in the form of a coherent philosophical and methodological system can be of scientific importance only if the generalisation and systematisation of what has been done go hand in hand with meaningful research into problems and analysis of pressing philosophical and methodological problems. Science and social practice change constantly, giving rise to new problems, and the categories of dialectics reflecting them cannot but change and be enriched with new content as well. Materialist dialectics, being the most comprehensive and profound theory of development, is itself in a state of constant development because it is most closely connected with reality, with the activity of mankind's progressive forces in the cognition and transformation of the world. Therein lies the earnest of its fruitfulness and scientific nature.

Naturally the production of Marxist works summing up advances in theory of dialectics implies not only synthesis, not only generalisation and systematisation of what has been done but also analytical research, creative elaboration of a whole series of fundamental problems and spheres in the theory of dialectics. The specific development of modern natural science, the socio-political transformations, the scientific and technological revolution and the present state of Soviet philosophical science require discussion, on a new level, of some fundamental questions bearing on this field of Marxist philosophical knowledge, and a more profound analysis of the methods which make research into the

theory of dialectics truly fruitful. Let us look at some of these questions.

Of fundamental importance in understanding the specifics of the Marxist mode of research and interpretation of dialectics is Lenin's famous thesis on the identity of dialectics, logic and the theory of knowledge. This thesis is of decisive importance for a correct understanding of the content and structure of materialist dialectics, its relationship with the natural and the social sciences, and for determining the direction and means of its further elaboration. It stresses the specific feature of materialist dialectics as a fundamentally new type of philosophical knowledge in which the study of the objective laws of development and that of the laws of reflection of objective reality in cognition are indissolubly connected. From this thesis it follows that in Marxist philosophy there can be no "pure epistemology" or "pure ontology".

"Pure epistemology", that is, an analysis of cognition that ignores the ontological prerequisites of knowledge, its objective determination, and the fact that cognition is included in the objectively real practical and social activity of cognising man, would correspond to the Kantian and neo-Kantian interpretation of the theory of knowledge rather than to the Marxist-Leninist interpretation of it. The history of philosophy tells us that the "purely epistemological" approach inevitably produces insoluble difficulties of philosophical order, the difficulties which become especially tangible in the attempts to apply it to the analysis of cognition. The point is that in the framework of this conception it turns out to be impossible to indicate any precise criterion to differentiate the philosophical and the specially scientific (notably psychological) analysis of cognition.

A "purely ontological" interpretation of Marxist dialectics would be equally false. Interpretation of the categories of materialist dialectics as "purely ontological" substances could in practice lead, first, to a situation in

which the elaboration of the theory of the Marxist materialist dialectics could be reduced to a peculiar "labelling" of philosophical categories on the ready-made content of special scientific knowledge characterising the present level of cognition of objective reality, bypassing the analysis of the role of the categories of dialectics have to play in obtaining, producing scientific knowledge; second, to a situation in which the criterion allowing a distinction between general philosophical categories, the categories of dialectics, from the most general concepts of natural sciences, would be lost.

The truly scientific approach to the elaboration of the categories of dialectics flows from Engels' proposition that materialist dialectics makes a study of the most general laws in the development of nature, society, and thought, and also from Lenin's above-mentioned thesis on the identity in Marxism of dialectics, logic and the theory of knowledge. This approach is based, on the one hand, on the fact that the categories of dialectics are not some kind of "subjective aid" for man, but are a reflection of the universal characteristics of objective reality, and on the other, on the clarification of the objective ("ontological") meaning of this or that category itself, which implies a consideration of the cognitive content of this category and of its methodological role in the production of knowledge.

A true "ontological picture" of the object in which the categories of dialectics have a definite role to play can be produced only after the cognitive function of these categories has been brought out. On the other hand, it is impossible to understand the cognitive function of the categories without considering their objective "ontological" meaning. Consequently, the philosophy of dialectical materialism overcomes the absolute counterposing of ontology and epistemology, which is characteristic of the most trends in non-Marxist philosophy. Marxism links up the scientific way of elaborating the categories of dialectics with the fundamental question of philosophy, the relationship between

consciousness and being, between the subject and the object. This mode of research is simultaneously methodological and profoundly philosophical in its very essence.

A study of the dialectical processes in reality, of social practice and of the development of scientific knowledge and reflection of these processes in the complex mutual connections and relationships of dialectical categories is the main way for developing the theory of materialist dialectics. The art of operating with concepts, including categories, Lenin said, "always demands a study of the movement of concepts of their interconnection, of their mutual transitions."¹

What modes of elaborating dialectical categories are the most promising and scientifically important? It would hardly be right, for instance, to orient oneself upon the "purely deductive" derivation of some ostensibly "final" relationships between the categories of dialectics (say, development and motion, the infinite and finite, etc.). Actually, the categories of dialectics are not a collection of ready-made and in themselves completed "absolute" bits of knowledge, whose relationships the researcher allegedly brings out with the aid of logical deduction. The content of the categories develops and changes with the development of human cognition and social practice, as fresh aspects and facets are brought out in the categories, as their relationships change, forming new meaningful categorial structures. The theory of materialist dialectics is not some "deductive" discipline: it cannot be abstracted from the study of development and change of knowledge.

The current scientific and technological revolution has posed most acutely the problem of analysing the logical structure of science, notably, the logical function of the categories of dialectics in the production of scientific knowledge. Nor does this imply alone that the changed role of science poses before society the management of science

¹ V.I. Lenin, Collected Works, Moscow, Vol.38, p.253.

as a practical and primary task, which, for its part, implies a knowledge of the latter. The especial importance of analysing the logic of science also springs from the fact that the scientific and technological revolution includes a fundamental change of the logical structure of science itself as a necessary component. The difference between modern and classical science can be characterised by a number of parameters: the different role of mathematical formalisms, of abstractions of a high order, the complexified relationship between the theoretical and the empirical level of knowledge, the lesser role of visual models as a means for interpreting abstract theories, etc.

In the context of the problem being discussed here, it is most important to stress, however, the changing categorical structure of scientific thinking, which is expressed, first, in the advance to the fore of categories that would have been in the background in the period of classical natural science (for example, necessity-chance, possibility-reality, object-relation, whole-part, subject-object, etc.) and, second, in the change in the logical links between the categories functioning in cognition. Although we have already many works dealing with the individual categories of dialectics, virtually the first few steps are being taken in analysing the categorical structure of modern scientific thinking in the light of the scientific and technological revolution. It is clear that in the analysis of the real practice of development of cognition and social life the elaboration of a coherent system of the categories of materialist dialectics must necessarily include the study of the impact of the scientific and technological revolution on the system of modern thinking, the impact of science on the character and style of philosophical thinking inclusive.

It is also necessary to note the following circumstance. The Marxist study of the logical structure of science (in contrast, say, to the neo-Kantian or neo-positivist) proceeds from the recognition that science and scientific cognition are not something contrasted to other forms of

cognition and other types of human activity. In particular, there is no sharp break between scientific and everyday cognition. When making a distinction between scientific and everyday cognition one should be clear that science constantly interacts with the latter. Unless these links are considered it is impossible to gain a correct understanding of the logical structure of science. Science cannot be converted into a package of artificially constructed formalisms because the clarification of the objective meaning of the latter necessarily implies their meaningful interpretation with the aid of conventional language.

Thus, the Marxist approach to the analysis of cognition and the clarification of the role in it of the categories of dialectics implies an analysis of the development of the forms of cognition, transition from pre-scientific to scientific cognition, interaction between scientific and everyday cognition and a historical change in the logical structure of the science itself. Clarification of the categorial structure which is specifically characteristic of modern science implies analysis of earlier structures. A study of the categories of dialectics as the apparatus of modern scientific thought necessarily implies a historical approach to the analysis of cognition, the approach whose importance was repeatedly emphasised by Marx, Engels and Lenin.

We still find urgent Lenin's idea that the Marxist theory of knowledge and dialectics should be formed from such fields of knowledge as the history of philosophy, the history of cognition in general, the history of individual sciences, the history of the mental development of the child and of animals, the history of language, psychology and the physiology of the sense organs.² This does not mean, of course, that the theory of dialectics should rest entirely on the data of the above-mentioned fields of knowledge. Every Marxist accepts that materialist dialectics must take

² V.I. Lenin, Collected Works, Vol.38, p.353.

account of the data of all the natural and social sciences (including mathematics, physics, political economy, etc.). Lenin stressed another point, namely, the impossibility of a theoretical elaboration of Marxist dialectics without the historical approach to analysing cognition. But this approach, which implies an analysis of science above all from the genetic standpoint (which is why there is special mention of the "history of individual sciences") cannot be reduced to an analysis of the history of science. It includes within itself "the history of cognition in general," notably the history of philosophy, the history of language, and at the same time an analysis of the history of individual cognition in the form of "the mental development of the child and of animals," psychology, etc. There is need for a "history of thought from the standpoint of the development and application of the general concepts and categories of logic."³ In other words, this implies a broad programme of Marxist research into the ontogeny and phylogeny of human cognition in their interaction.

The importance of this Leninist programme for a truly scientific elaboration of the theory of dialectics is especially clear today.

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In the modern epoch, with science exerting such a radical influence on social life, one of the key conditions for the fruitful development of materialist dialectics is the constant strengthening and improvement of the alliance between Marxist dialectics and natural science. This alliance is based on a common concern for the development of knowledge, a search for the truth. Indeed, it is with the help of materialist dialectics that scientific solutions can be found for the philosophical problems arising in the course of natural science development. The development of science and scientific cognition is the living soul of the theory of

³ Ibid., p.177.

dialectics itself. Materialist dialectics, providing general solutions for the methodological problems which appear in every science in more concrete and specialised form in the course of its development, simultaneously develops and enriches its own content. In the further elaboration of dialectics as a philosophical science and the production of works summing up the theory of dialectics, it is also important to give attention to some of the problems connected with the nature of the division of labour in this field. In particular, there arises the question of the place of the elaboration of philosophical and methodological problems, produced by the natural and the social sciences, in the development of the general theory of dialectics, a question of the relationship between philosophers specialising in the problems of materialist dialectics in general philosophical form and those who analyse these problems on the strength of data in this or that special science. Here we are dealing only with the different levels of analysis of the same set of problems. In one instance, this will be the general philosophical level implying discussion and analysis of the problems of Marxist dialectics not only in connection with modern natural science data, but also on the basis of consideration of the data provided by the social sciences, modern social practice, the long history of philosophy and the whole history of human thought as a whole. In another instance, the general problems of the theory of dialectics are analysed to the extent this is required by the needs in the development of this or that special natural science.

The elaboration of all these problems can be successful only when the two above-mentioned levels of analysis are not contrasted with each other but are harmonised and interact with each other, and when the analysis of the general fundamental problems of the theory of dialectics rests on the results of the study of particular problems of materialist dialectics, logic and the methodology of science,

The development of the theory of dialectics on the strength of data provided by the special sciences implies a philosophical study not only of natural science but equally of social science. This means analysis of dialectics as a theory of socio-practical activity and as the methodological and philosophical basis of the social sciences, the sciences of man. One-sided orientation of research in the field of dialectics on an analysis of philosophical problems posed by the development of modern natural science, with relatively little attention to the philosophico-methodological problems in socio-humanitarian knowledge cannot promote the allround elaboration of the theory of Marxist dialectics as a world outlook and methodology fully applicable to any scientific cognition. The truly scientific analysis of the fundamental principles of materialist dialectics (the dialectic of subject and object, the dialectical character of practical activity, the socio-historical nature of cognition, etc.) implies analysis of social phenomena. The socio-historical dimensions of human activity are seen by Marxism not merely as a particular form expressive of some extratemporal ontological substances, but as a substantial component of the very content of fundamental concepts of materialist dialectics, like practice, consciousness, cognition, the ideal, etc.

Thus, for fundamental reasons Marxism rejects the contrast characteristic of pre-Marxist philosophy between the universal-metaphysical (ontological and epistemological) problems and philosophical problems in socio-humanitarian knowledge. Let us recall that Marx, Engels and Lenin elaborated dialectics in their writings precisely in connection with their scientific analysis of social reality. The need for a creative and comprehensive study of the dialectic of social processes, the dialectic of social cognition is dictated by life itself, by the complexity and dynamism of social tendencies which run in different directions but which nevertheless interact with each other, and contradictions characteristic of the epoch of transition from capita-

lism to socialism, the struggle between the capitalist and the socialist systems, the epoch of mature socialist society, and the scientific and technological revolution. Without a profound understanding of the dialectic of social reality and of the place in it of different types of contradictions, the dialectical connection between the laws of the functioning of social structures and the laws of their development and genesis, and the relationships between progress and regress it is impossible to produce a coherent scientific picture of the modern epoch. Nor can one ignore the fact that the complexification and differentiation of social cognition sharply raises the question of its provision with methodological principles.

It is pertinent to note the fact that modern revisionism, which has proposed its own interpretation of Marxist dialectics, and has sought, in particular, to reduce it to the dialectic of practical human activity, has tended mostly to speculate on the difficult problems of the dialectic of social activity and social cognition. The distortions of the dialectic of social activity and cognition which are so widespread in present-day bourgeois philosophical writings are frequently presented as being a "precise interpretation" of Marx's dialectics. In this connection research into these problems is not some kind of "side-line" or "applied" field with respect to the elaboration of the general theory of materialist dialectics, not just one of the "examples" illustrating the general propositions of Marxist dialectics: outside the context of social analysis there can be no scientific understanding of the fundamental principles of materialist dialectics, which means the whole of it itself. Analysis of the dialectic of social processes and social cognition now appears as one of the most important forms of the elaboration of the general theory of Marxist dialectics.

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The regularities of present-day scientific cognition also have a full effect on the specific features of the pre-

sent stage in the elaboration of materialist dialectics as the logic and methodology of science. The internal differentiation of methodological analysis itself has become a fact, branches of special scientific knowledge directly oriented upon an analysis of various aspects of man's cognitive activity have emerged and are developing successfully. Without ceasing to be special sciences, such modern sciences as semiotics, the theory of information, modern formal logic, the systems and structural approach and others, seek to formulate definite methodological approaches and instruments for studying scientific knowledge. In this situation, we find the acute question of the very status of the methodology of science, the question of what this discipline is: does it have a tendency to develop into a special science distinct from philosophy? Should it, in principle, remain within the framework of philosophy in the mode of presentation and analysis of its problems, or should it be considered a peculiar synthesis of philosophical and special-science components?

In tackling this important and complex problem one should apparently start from the assumption that in the methodology of science, as now constituted there exist different levels of study with their inherent methods and modes of analysis of the cognitive process so that far from all of these could or should be directly classed as philosophical. A substantial part of methodological experiments, carried out with the aid of non-philosophical methods and instruments (for instance, formal logical methods) has all the essential marks of special-science research and does not in itself lay claim to formulating a general methodology of scientific cognition. This function can be assumed only by materialist dialectics as a philosophical science. Indeed, it is materialist dialectics that studies nature and the possibilities of scientific cognition, the relation between scientific knowledge and reality, the conditions in which it can be regarded as being true, its genesis, etc. Being oriented upon a search of the universal principles of scien-

tific knowledge, the conditions in which it can be regarded as being true and authentic, the prerequisites and mechanisms for the formation of new knowledge in science, materialist dialectics has the function of the universal and fundamental methodology of scientific cognition.

In contrast to the special-science methods and modes of analysis of scientific knowledge bearing on individual aspects of the cognitive process, materialist dialectics considers all methodological problems in the light of the basic characteristics of the human attitude to the world, that is, in the form of the subject-object relation. In materialist dialectics, knowledge itself is regarded as an aspect of a richer whole, which includes every form of human relation to reality in the context of the whole of social activity itself based on the productive activity of social man. This view of scientific cognition implies an analysis of the social mediation of the cognitive process, the role of language, and the modes of operating with things worked out by the earlier development of human culture, and analysis of the possibilities of cognition depending on its inclusion into different types of social activity, expressive, in particular, of the practice of different classes.

Special-science methods and instruments of analysis of man's cognitive activity are a different matter. They perform the function of specific, ancillary methodological regulators in the advance of science towards the truth. The very possibility of applying this or that special-science apparatus to the analysis of man's cognitive activity and also the evaluation of the results obtained in this way depend on the definite prerequisites and concepts of the substance of man's cognitive activity, whose authenticity is not discussed within the framework of these disciplines themselves and which are in essence philosophical and generally methodological. All of this shows that the development of special-science instruments of analysis of the problems of methodology does not in any sense do away with methodology as a philosophical discipline or convert it into a branch

of special-science knowledge. Any attempt at structuring a more or less coherent system of methodology must necessarily result in the need for special analysis of problems like the nature of knowledge, the character of its relation to reality, the nature of truth and the modes of verifying it, that is, of all those problems whose solution necessitates the taking of a definite philosophical stand. The collapse of the logico-positivist conceptions of the logic of science has visually demonstrated the impossibility of structuring a methodology of science as a special-science discipline separated from or opposed to a philosophical analysis of cognition.

Thus, the methodology of science is a comprehensive discipline taking shape on the basis of materialist dialectics with its inherent methods and forms of thinking and also from a considerable number of non-philosophical instruments and methods of analysis. The central place in this complex-differentiated and developing whole belongs to materialist dialectics, which has the function of the universal and fundamental methodology of scientific cognition. This overall solution of the problem concerning the status of methodology of science does not imply a facile solution for all the problems connected with defining the place and role of materialist dialectics within the system of the methodological instruments of modern science. In practice it is not always easy to draw a distinction between the philosophical and the concrete scientific level, especially in view of the fact that special-science methods frequently claim to make a contribution of their own to the solution of general methodological problems.

Further intensified elaboration of materialist dialectics in the function of the logic and methodology of modern science implies broad discussion of such fundamental problems as philosophy and the special sciences, methods of obtaining and confirming philosophical knowledge, the concept of "scientific character" in general and its expression in philosophical and special knowledge, the composition of

the logical methods and instruments of cognitive operations which in the aggregate make up dialectical logic, the relation between dialectics and the forms of thinking studied by modern formal logic, the various abstract mathematical and cybernetic methods of simulating the processes of development and change, and the various formal methods of systems analysis. A discussion of all these problems will help more fully and concretely to define the specific subject-matter of dialectics in the study of the cognition of the forms and methods of thought.

On the other hand, an analysis of the place held by dialectical materialism as the universal and fundamental methodology of scientific analysis within the system of methods, approaches and modes of analysis and the production of knowledge, worked out by modern special sciences implies intensive analysis of the cognitive and methodological value, conditions and limits within which all the non-philosophical modes of studying various aspects of man's cognitive activity can be applied. The mastery of new apparatuses and instruments of methodological analysis, extension and enrichment of its store of instruments undoubtedly help to concretise and spell out in detail many important methodological and theoretico-cognitive problems in modern scientific cognition and ultimately to intensify the influence of materialist dialectics on the development of science itself. At the same time, the tendency towards the ever greater use of non-philosophical instruments in methodological analysis must necessarily produce--at the early stages, at any rate--definite difficulties (absolutisation of the place and role of special science instruments of methodological analysis, underestimation of the methodological value of general philosophical categories, etc.) This applies to those methodological instruments of modern science which have a fairly long way of historical development behind them but which in the past few decades have gone through a period of tempestuous renovation and enrichment, as for instance, formal logic.

Let us bear in mind that formal logic, which long developed mainly towards mathematical applications, has begun actively to intrude into totally new areas of research. Its ideas and methods have been intensively used in discussing many methodological problems. The impact of modern formal logic is connected, in particular, with the elaboration of new methodological methods (formalisation, axiomatisation, interpretation, etc.), and with deeper analysis of the logical features of many traditional methods of cognition (definitions, explanations and predictions, various types of abstraction), with the substantial extension of deductive and inductive patterns of conclusion, etc. At present, formal logic is taking its first few steps towards working out adequate logical means for expressing some aspects of the development of knowledge. The basis for such an approach has taken shape as a result of the powerful extension of the range of formal-logical instruments of analysis, above all as a result of the elaboration of so-called non-classical logics (multi-value, modal, probability, etc.).

The growing cognitive value of formal logic makes it necessary, while maintaining the fundamental Marxist stand with respect to the latter (understanding of its internal limitations, recognition of the qualitative distinctions between dialectical and formal logics, etc.) to specify the assessment of the possibilities of formal logic which flowed from the level of its development in a given historical epoch (for instance, the opinion about the elementary, "school" character of logic, the notion that formal logic operates only with the two polar evaluations of "yes" and "no"), etc. These and certain other assessments with a direct bearing on a given level of development of formal logic must necessarily be outdated in the course of logic's historical development and the emergence of fundamentally new horizons and prospects for its development. Their uncritical use in the new historical conditions could lead to definite negative consequences and hamper the working out of the Marxist attitude not only to formal logic but also to all the other

non-philosophical methods and modes of analysis of various aspects of man's thinking.

The new situation taking shape in the methodology of science brings out a number of fundamental problems connected with the comprehension of the structure of methodology and the prospects for its development. These problems, no doubt, will attract ever greater attention among Marxist philosophers as dialectical materialism itself and the special sciences develop.

Considering the question of developing materialist dialectics at the present level, there is need to continue to develop the traditional Leninist attitude to the philosophical legacy of the past, to the history of dialectics. It is hardly possible to gain a profound and truly philosophical comprehension of modern problems in materialist dialectics without considering the history of dialectics, notably, German classical dialectics, the dialectics of thinkers like Socrates, Plato, Aristotle, Nicholas of Cusa, Spinoza and others. Alongside the analysis of various episodes in the history of dialectical thinking substantial importance attaches to the working out of general philosophical problems in the history of dialectics and the analysis of the basic historical forms of dialectics. An in-depth study of the real content of these forms, both from the standpoint of mediated reflection within them of the objective dialectic of social processes and from the standpoint of philosophical reflection of thought processes and structures characteristic of the various historical epochs will help to emphasise in every way the qualitative unique nature of materialist dialectics, and the flimsiness of the criticism levelled against it by bourgeois and revisionist falsifiers, thereby gaining a deeper insight into the very substance of Marxist dialectics.

The elaboration of a theory of materialist dialectics presupposes the fundamental fact that at present an ideological struggle in the international arena is underway over

the interpretation of Marxist dialectics. Falsification of materialist dialectics has become one of the basic forms of distorting Marxism both by Right-revisionists and by the Macists. Today no positive analysis of the problems of Marxist dialectics is possible without an allround critique of these distortions.

LENINISM VERSUS SUBJECTIVISM AND OBJECTIVISM

Academician Pyotr Fedoseyev

Our epoch abounds in enormous changes in all spheres of human society and the new phenomena and new processes we witness require a thorough theoretical analysis. In these conditions an ever greater importance is assumed by dialectical and historical materialism as a method of cognising social phenomena.

The consistent application of Marxist-Leninist methodology is particularly significant in the present-day ideological struggle. Experience shows that any revision of Marxism, any departure from its methodology in explaining social phenomena ultimately leads to a renunciation of the materialist theory of knowledge. This was well understood by Lenin, who upheld and developed the materialist world outlook and the materialist understanding of history in his tireless struggle against the enemies and falsifiers of Marxism.

Lenin disclosed the initial methodological positions of the enemies of the theory and practice of revolutionary Marxism. He showed that the methodological foundation of the bourgeois and revisionist conceptions of social development was provided either by subjectivism in history to which in practice voluntarism corresponds, or by fatalism, which proceeds from the mechanistic, metaphysical interpretation of the objective laws of social development. Throughout his

activity Lenin waged a systematic struggle against these trends in social life, demonstrating their theoretical insolency in philosophy, sociology and political economy and laying bare their reactionary class tendency.

The importance of Lenin's struggle against objectivism and subjectivism by no means amounts merely to a defence of the Marxist method of cognition of social life. Lenin furnished classical models of the application of this method to new historical phenomena and helped to enrich and develop it further. He repeatedly noted that it was not enough to know well and cherish the theoretical legacy left by the founders of Marxism; it was necessary to apply this legacy in concrete social situations, in analysing every new turn of events, especially when changed historical conditions dictate a review of some earlier formulas and the elaboration of new theoretical propositions.

Subjectivism, the Enemy of Materialism

The bourgeois critics of Marxism and the revisionists often accuse Lenin of subjectivism, of underestimating "spontaneous," objective processes of social development. Such interpreters of the history of Marxism contrast Lenin and Marx, presenting the situation as though Marx laid emphasis on the material, objective basis of the revolutionary process, while Lenin supposedly disregarded these processes and staked everything on subjective factors in history. Thus, the Austrian revisionist Ernst Fischer published in August 1969 an article in the London Times, alleging that Lenin underestimated the spontaneous processes of the revolutionary movement and reduced the whole matter to organising a revolutionary minority.

In reality Lenin regarded subjectivism as the antipode of Marxism, the antipode of the scientific approach to questions of the revolutionary struggle. As far back as the end of the last century, Lenin, in such works as What the 'Friends of the People' Are and How They Fight the Social-

Democrats, The Economic Content of Narodism and the Criticism of It in Mr. Struve's Book and A Characterisation of Economic Romanticism, demonstrated the methodological untenability of subjectivism and the related social project-mongering by petty-bourgeois ideologists on the basis of a critical analysis of the subjectivist sociology of the Narodniks and of the subjectivist conceptions in political economy.

The proponents of the subjective method in sociology (N. Mikhailovsky and others) tried to prove that Marxism is "limited" by the allegation that it does not consider the role of the individual in history and takes into account only "historical necessity" and "economic categories." In disproving these allegations Lenin stated in the spirit of Marxism: "... All history is made up of the actions of individuals, who are undoubtedly active figures."¹

Pointing to the banality of the Narodnik arguments about "living individuals," whom Marxists supposedly ignored, Lenin pointed out that the Narodniks in effect repeated the mistake of the 18th century philosophers, who sought to make a contrast between the individual with his aims and notions of due to exist and the socio-historical environment. The Narodnik criticised Marxism from the positions of yesterday's philosophy. When he regards the environment and some kind of an abstract individual outside history as two independent factors of historical development, he "simply strikes out the entire development of social science since the end of the last century and reverts to naive rationalistic speculation, which ignores the existence and the development of definite social relationships. With one stroke of the pen he wipes out all that the human mind, in its attempt to understand social phenomena, has achieved at the price of centuries of searching!"²

¹ V.I. Lenin, Collected Works, Vol.1, p.158.

² Ibid., Vol.2, p.224.

Lenin regarded as the greatest achievement of 19th-century social science (ignored by the subjective school in sociology) the materialist understanding of history substantiated in the works of the founders of Marxism. It was Marx who succeeded in eliminating the counterposing of the individual to the social environment, in which authors of rationalistic constructions foundered in the 18th century.

The real distinction of the Narodnik from the Marxist, according to Lenin, consists by no means in that the former studies "living individuals," while the latter regards such a study as inessential, but in the difference between the scientific and unscientific approach to the study of society, including the actions and behaviour of real individuals, of whom society is composed. Only when it was proved that the motives for the behaviour of individuals are ultimately determined by economic relations which do not depend on their will did the opportunity arise, for the first time, to describe and explain these motives.

Lenin began to examine the subjective sociology of the Narodniks with the question, to what extent does it meet the demands made on scientific cognition. As a result of his analysis he arrived at the conclusion that subjective ideology cannot be anything but an ideological form of expressing the "thoughts and sentiments" of its authors who, in turn, represent a definite social group. In other words, the problem of the scientific value of a theory inevitably grows over into a social problem, the class essence of the theory.

The logic of this argument is particularly important because bourgeois critics of Leninism constantly harp on the point that Lenin supposedly "imposed" the problem of partisanship on social theory, that he "demanded" of social science--supposedly neutral in its theoretic-cognitive essence--a definite class stand. The very opposite, however, is the case. Lenin came to his conclusion about the ideological function of social theory specifically as a result of

analysing its cognitive aspects. Let us turn to the examination of Mikhailovsky's methodological positions in What the 'Friends of the People Are' and How They Fight the Social-Democrats.

Mikhailovsky accused Marx of failing to give definitions of the type "What is society in general", "What is progress in general", and so on. On this ground Mikhailovsky concluded that the materialist understanding of history which Marx elaborated simply did not exist.

Lenin first of all noted that the very formulation of the problem by Mikhailovsky ran counter to the criteria of a scientific study. The scientific concept of society, progress, and the like can be a result, and not a prerequisite of study. Science has only one way arriving at the concept "society": through an analysis and generalisation of empirical facts, which make up the content of real historical social conditions, by singling out from these facts the most essential characteristics, by establishing their recurrence in different social conditions. On the contrary, what Mikhailovsky demanded of sociology "is a most obvious symptom of metaphysics, with which every science began: as long as people did not know how to set about studying the facts, they always invented a priori general theories which were always sterile."³

Lenin drew attention to the fact that nine-tenths of the social theories of his day consisted precisely of such speculative arguments. Naturally all this could not be explained merely by individual delusions of scientists. If such methods, "not advancing one hair's breadth man's understanding of even a few, but real, social relations" are nevertheless again and again used by scientists, they consequently discharge not a cognitive but some other function. Lenin characterised it as follows: "... Such methods, instead of contributing to a study and elucidation of the problem, only serve to insinuate into the concept 'society'

³ Ibid., Vol.1, p.144.

either the bourgeois ideas of the British shopkeeper or the petty-bourgeois socialist ideals of the Russian democrat—and nothing more."⁴ Such a view of the problem of the scientific value of social theory leads us to the problem of class and partisan nature of this theory.

Marxist-Leninist theory merely registers the real state of social science in a class society, the actual fulfilment by it, alongside a cognitive, also of an ideological function. Thereby the accusation that Marxism-Leninism "artificially", "unlawfully" raises the question about the class nature of social knowledge is deprived of all foundation.

It should be emphasised that Lenin criticised Narodnik theories not only for the fact that, being an ideology, they reflected the interests and aspirations of definite social groups. He criticised Narodnik sociology above all because in it ideological and cognitive functions came into contradiction and the scientific method of analysis was replaced by subjectivist constructions.

The meaning of Lenin's critique of the Narodnik conception, of course, is not tantamount to exposing some concrete sociological school. Lenin examined the given school as one of the possible manifestations of subjectivism in science and, therefore his critique is of universal significance. The root of subjectivism in sociology, as Lenin pointed out, is the inability or unwillingness of sociologists to "distinguish the important and unimportant in the complex network of social phenomena," to find an objective criterion for such a delimitation.⁵

Subjectivism as a theoretical method is found everywhere where there is a denial of the existence of objective truth and objective criteria of social knowledge, wherever the exploration of scientific truth is replaced by speculation and sophistry, by historical and sociological relativism. The danger of subjectivism, however, exists not only

⁴ Ibid., p.145.

⁵ Ibid., p.140

there where it is formalised into a complete system of principles. The substitution of the unimportant for the important, the mixing up of the essential and inessential, the absolutisation of theoretical propositions can lead any researcher to mistakes of a subjectivist order at every stage of his penetration into the essence of social phenomena.

Subjectivism by no means always openly breaks with scientific approach or puts up utopian constructions against a strictly scientific study of social relations. Utopianism and "romanticism," being typical causes and simultaneously the consequences of subjectivist deviations from the scientific method of study, nevertheless often appear in the form of scientifically-based truths, which supposedly consider the achievements of scientific thought and draw on these or those elements of a scientific analysis. It is to this circumstance that Lenin paid special attention criticising, in particular, romantic conceptions in the sphere of economic doctrines.

The subjectivist theory can record the same phenomena, the same processes of social life which also fit into the framework of a scientific theory. In his work A Characterisation of Economic Romanticism, Lenin specially stressed that the conception of the economist-romanticists and the theory of Marx point to the very same contradictions of social economy under capitalism. It is also possible to note such objective phenomena of the economy of capitalist society as the existence of crises, the search for foreign markets, the rise in productivity at a time of decreasing consumption, the existence of monopolies, the harmful effect of machine-based industry on the workingman, and so on, without emerging from the confines of a subjectivist economic theory. In this connection a scientific critique of subjectivism faces two problems: first, where, at what level of investigation and for what reason the departure of the "romanticist" from the demands of the scientific method begins; and second, how scientific (Marxist) theory must regard the studies in con-

crete social sciences made by scholars who do not adhere to the position of scientific (Marxist) philosophy.

Concerning the answer to the first question, Lenin showed that the deviation of the "romanticist" from the demands of the scientific method begins where the analysis of a real economic state of society presupposes an evaluation of this state from the viewpoint of the prospects of the struggle of social forces and tendencies, from the viewpoint of the class struggle, and where the ideological position of the researcher comes into contradiction with his scientific conscientiousness.

The reply to the second question is found in the later works of Lenin, specifically in Materialism and Empirio-Criticism where Lenin drew a distinction between special studies in the social sciences and the conclusions expressing the Party position of the scientist. The task of a Marxist, as Lenin emphasised, consists in assimilating and re-working the concrete results achieved within the bounds of these studies and in being able to lop off their reactionary line.

Materialism and Empirio-Criticism demonstrates the complete insolvency of the subjective idealist interpretation of the problem of truth, reveals the importance of the dialectical materialist understanding of objective truth in the theory of knowledge, science and practical activity.

One of the main problems examined by Lenin in this work is that of the objectivity of truth. As is well known, at that time, under the influence of the rapid progress of scientific knowledge, the review of seemingly immutable scientific notions, the collapse of all theories and their replacement by new ones, and attempts to interpret truth in the spirit of relativism and conventionalism, became quite fashionable.

Such tendencies were opposed by the Leninist doctrine of the dialectic of knowledge, the correlation of absolute and relative truth. Admitting the relative nature of our

knowledge Lenin came out against dogmatism, against the ossification of thought and for the creative development of theory. At the same time, asserting the objectivity of human knowledge, demonstrating the dialectic of the conversion of relative into absolute truth, Lenin gave battle to relativism, which denies the validity of the fundamental propositions of science, including the Marxist theory of social development.

Subjectivists usually try to pose as enemies of dogma. But dogma itself is understood by them as a simple synonym for everything conservative and generally recognised. As a result they turn the struggle against dogmatism into a nihilistic denial of any values of the past, into a quest for innovation for the sake of innovation.

For Lenin, on the contrary, dogmatism was always the reverse side of subjectivism, a distortion, a departure from objective truth. Therefore, he emphasised, "there can be no dogmatism where the supreme and sole criterion of a doctrine is its conformity to the actual process of social and economic development."⁶

While exposing subjectivism and relativism and disclosing the dialectic of absolute and relative truth in the process of cognition, Lenin demonstrated the role of practice as the basis of cognition and as the objective criterion of truth.

In contrast to pragmatism, which regards utility and benefit as the criterion of truth, he proved that objective truth does not depend on the aims and intentions of man. Knowledge as such can be useful precisely because it contains objective truth. Lenin clearly formulated the fundamental propositions of the materialist theory of knowledge on this question: "Knowledge can be useful biologically, useful in human practice, useful for the preservation of life, for the preservation of the species, only when it

⁶ Ibid., p.298.

reflects objective truth, truth which is independent of man."⁷

Objectivism, the Ideological Foundation of Reformism

Criticising subjectivism, Lenin at the same time devoted great attention to the struggle against another initial methodological position of the opponents of the theory and practice of revolutionary Marxism—bourgeois objectivism.

Particularly important in this respect is Lenin's work The Economic Content of Narodism and the Criticism of It in Mr. Struve's Book. Fatalistic distortions of scientific socialism became widespread at the end of the 19th century in so-called legal Marxism in Russia and in Bernsteinism in the West. These trends were marked by a deviation from a class analysis of phenomena, an objectivist interpretation of social processes. In his critical analysis of Struve's book, Lenin consistently, layer by layer, stripped the shell of "scientific impartiality" from bourgeois objectivism and laid bare its class, bourgeois substance.

As for the methodological side of the matter, objectivism is marked by one-sided metaphysical emphasis on the historical inevitability of the existing social system, by ignoring its intrinsic contradictory nature, which ultimately, with similar inevitability, must lead to the emergence of a new quality.

In his criticism of the methodological positions of the subjectivists and "objectivists" Lenin was invariably guided by the dialectical method. "In brief, dialectics can be defined as the doctrine of the unity of opposites. This embodies the essence of dialectics, but it requires explanations and development."⁸ Such "explanations and development" were provided by many of his works in which this was done on the basis of an analysis of vast socio-historical and scientific

⁷ Ibid., Vol. 14, pp. 139-140.

⁸ Ibid., Vol. 38, p. 223.

material, on the basis of solving fundamental problems of social development which have a general methodological, philosophical significance. Lenin's Philosophical Notebooks offer an example of a creative approach to the revolutionary method of Marxism.

It should be noted that some revisionist theoreticians like R. Garaudy allege that Lenin, in his Philosophical Notebooks, departed from the positions of materialism and recognised the inadequacy of the theory of reflection, which supposedly does not take into account the active nature of cognition. Reference is made to the well-known statement in the Philosophical Notebooks that consciousness not only reflects but also creates the world. In reality, however, the Philosophical Notebooks are a consistent continuation and development of Lenin's preceding works. As for the proposition that consciousness not only reflects but also creates the world, every conscientious reader sees that, in the given case, Lenin in his own way summed up and interpreted the thought of Hegel in juxtaposition with the mechanistic notions of pre-Marxian materialism. Interpreting these thoughts materialistically, Lenin said that, when man is not satisfied with the world, he decides to change it by his activity.⁹ This in full measure corresponds to Marx's well-known thesis: "The philosophers have only interpreted the world in various ways; the point, however, is to change it."¹⁰

An objectivist understanding of the laws of social development turns into fatalism, into hope in the automatic operation of the historical process, into worship of spontaneity in the revolutionary transformation of the world. Denial or narrow understanding of the class struggle and its importance for social progress leads to belittling the role of the subjective factor.

⁹ Ibid., p.213.

¹⁰ K. Marx and F. Engels, Selected Works, Moscow, 1969, Vol.1, p.15.

In the book What Is to Be Done? and in subsequent works dedicated to a critique of the Mensheviks and West European opportunists, Lenin consistently exposed the fatalistic understanding of the historical process as the ideology of adaptation to existing bourgeois relations, as the ideology of the renunciation of revolutionary methods of struggle. He set up, in opposition to the opportunist theories, an analysis of the dialectic of the subjective and objective in the process of social development, the teaching of the importance of the conscious element for the revolutionary remaking of society.

The teaching on the socialist revolution holds a cardinal place in Lenin's theoretical legacy. A study of the Leninist elaboration of this question is particularly instructive. On the one hand, it enables us to understand the importance of the conscious and consistent application of scientific methodology for social theory. On the other hand it is in the theory of the socialist revolution elaborated by Lenin that we see that every step in the scientific cognition of society is inconceivable outside the struggle against subjectivist and objectivist conceptions, a struggle during which new problems, new aspects of the approach to the study of social processes are inevitably revealed. The scientific theory of the socialist revolution could not arise within the bounds of metaphysical notions of the laws governing social development; the dialectical method was necessary for creating it.

For Lenin, dialectics is not the totality of formal methods of description, not some kind of a scheme given in advance and imposed on the object. For him the dialectical approach to reality is first of all the demand for "immersion" in concrete economic, political and other material, i.e., the objective dialectic of reality as such. And only to the extent that the scientist's thought really assimilates this material is society revealed in its actual complexity and contradictoriness.

Elaborating the theory of the socialist revolution and ascertaining the prospects of the world revolutionary process, Lenin first of all turned to an analysis of economic relations in the new world epoch which began at the turn of the last century. He disclosed the economic essence of imperialism, the unevenness of economic and political development, the influence of monopoly capital on the alignment of class forces, the political and ideological development of society. The results of these studies were expounded by Lenin in his Imperialism, the Highest Stage of Capitalism and in other works.

Bourgeois reformists and revisionists now refer to new phenomena in capitalist society as a pretext for renouncing the revolutionary struggle. They claim that contemporary capitalism, without transferring the means of production into social ownership, has attained planned, balanced development and thereby has put an end to the anarchy of production and unemployment.

Lenin more than half a century ago, we note, not only furnished an analysis of the essence of imperialism as a whole but also was the first to discern and scientifically evaluate the emergence of state-monopoly capitalism. It was Lenin who demonstrated the possibility of planning under conditions of monopoly capitalism, especially at its state-monopoly stage. But at the same time he noted that the introduction of planning under capitalism did not remove the exploitation of the working people and did intensify the dominance of capital. "Planning," he pointed out, "does not make the worker less of a slave, but it enables the capitalist to make his profits 'according to plan.' Capitalism is now evolving directly into its higher, regulated, form."¹¹

With his analysis of the nature of imperialism Lenin proves the insolvency of bourgeois and reformist theories of "ultra-imperialism," "organised capitalism," and the like.

¹¹ V.I. Lenin, Collected Works, Vol.24, p.306.

Even at the higher stage of its development capitalism cannot eliminate its intrinsic social antagonisms.

Criticising Kautsky's theory of "ultra-imperialism" based on the notion that imperialism, in the course of its development, will arrive at a single worldwide trust, Lenin emphasised that real history had never proceeded so fatally. The content of the historical process is never a purely mechanical growth of one quality, the automatic intensification of one tendency. History is always the interaction of numerous forces, numerous tendencies, of which not one is realised in a pure form. That is why, although it is possible to imagine in the abstract form that the tendency towards centralising capital could lead to the organisation of a single world trust, such a possibility could never be achieved in reality.

Lenin's characterisation of imperialism also helps to understand present-day developments in world capitalism. The concentration and internationalisation of capital continues to grow tremendously. Under the pressure of circumstances state regulation of production and distribution is extended in a number of countries. But actually such regulation represents state protection of the mounting profits of the capitalists, a form of systematic exploitation of labour.

In the course of the scientific and technological revolution the efficiency of production rises in capitalist countries. But uneven economic and political development, inherent in capitalism, is further deepened. Alongside the growth of the economy in individual highly developed countries (even in this group of states by far not evenly), in the greater part of the capitalist world economic backwardness, want and poverty are on increase.

State-monopoly capitalism socialises production in developed capitalist countries on a gigantic scale. The socialisation process is also effected on an international scale: multinational companies of monopoly capital are emerging, production complexes encompassing a number of countries are

springing up. The result is that the main contradiction of capitalism--between the social nature of production and the private method of appropriation--is deepened to the extreme and the task of turning over the means of production into social ownership is becoming more pressing.

Lenin developed the theory of the socialist revolution and upheld it in the struggle against the numerous enemies of Marxism--the Mensheviks and the Socialist-Revolutionaries, the Trotskyites and the "Left" Communists, the leaders of the Second International and all kinds of anarchists.

Lenin's critique of all these distortions and deviations from Marxism, which are based either on objectivist or subjectivist variants of the methodology of bourgeois philosophy is of principled importance for our time in the ideological struggle against the Right and "Left" revisionists, against the ideology of Social Democracy and all kinds of bourgeois-reformist conceptions.

To this day there are conceptions analogous to the Narodnik-Socialist-Revolutionary theory which rejected the leading role of the working class in the revolution, set up village against the city, the peasant masses against the working class. In different combinations and variants there are spread views which greatly resemble the Menshevik-Trotskyite conception of revolution that ignored the revolutionary role of the peasantry and denied the ability of the proletariat to lead the non-proletarian masses. In recent years the anarchist theories of revolution as a spontaneous explosion, as a rebellion, have once again been animated. These theories challenge the need for proletarian organisation and state leadership of society by the proletariat.

The opportunists have borrowed the ideological legacy of the reformist leaders of the Second International who replaced the revolutionary prospect by a stake on partial reforms, on the spontaneous development of capitalism into socialism. That is why Lenin's critique of anti-Marxist views on the question of revolution is so instructive.

Dialectics and a Creative Approach to Theory

Lenin called dialectics the soul of Marxism. Examining all phenomena in their development, dialectics demands a creative approach to theory, to the analysis of social processes.

The dialectical understanding of contradictions presupposes an analysis of the conditions under which possibility turns into reality. We refer to the proposition that historical necessity is not fatal inevitability, that it is displayed in every historical "moment" only in the form of a tendency, only in the form of a greater or smaller possibility to develop along this "historically necessary" path, that in every concrete moment of history--particularly in its crucial moments--there is also the possibility of a different development. And what objective path society will follow depends to a considerable extent on the subjective factor, on the confrontation of classes, groups, parties and leading personalities.

Lenin gave the deepest exposition of this question in analysing the prospect of building socialism in our country. Characterising the danger of petty-bourgeois spontaneity after the victory of the October Revolution, he said: "Either we subordinate the petty-bourgeoisie to our control and accounting (we can do this if we organise the poor, that is the majority of the population or semi-proletarians, round the politically conscious proletarian vanguard), or they will overthrow our workers' power as surely and is inevitably as the revolution was overthrown by the Napoleons and Cavaignacs who sprang from this very soil of petty proprietorship."¹² Clearly such an understanding of historical necessity has nothing in common with a fatalist understanding of the laws governing historical development.

Lenin concretised his position on the given question in his work On Our Revolution. In it he proceeded from a differ-

¹² Ibid., Vol.27, p.337

rentiation between the "general line of world history" (which registers the order of the appearance of the "fundamental requisites of civilisations" within the bounds of all mankind) and the possibility of different forms of transition to the creation of the "fundamental requisites of civilisation" of an individual people. The historically inevitable sequence of the appearance of the fundamental requisites of socialism is obligatory only within the bounds of world history. Socialism, for example, could not appear before mankind as a whole passed the stage of capitalism and reached a stage of civilisation that corresponds to it. But within the framework of the history of individual peoples the sequence and forms of the appearance of the fundamental requisites of civilisation may be different. "You say," Lenin replied to the theoreticians of the Second International, "that civilisation is necessary for the building of socialism. Very good. But why could we not first create such prerequisites of civilisation in our country as the expulsion of the landowners and the Russian capitalists, and then start moving towards socialism? Where, in what books, have you read that such variations of the customary historical sequence of events are impermissible or impossible?"¹³

Thus, elaborating the theory of revolution, Lenin at the same time disclosed the insolvency of reformism, of the Right-wing opportunism that ignores revolutionary possibilities and the need for their active use, and also of voluntarist revolutionism which denies the objective laws of revolution.

Criticism of various distortions and deviations from the Marxist method of cognising and transforming social life is contained in many works of Lenin which were written after the victory of the October Revolution and which deal with the elaboration of plans for building socialism in the Land of Soviets, the establishment of the main laws of the socialist transformation of society and also the accomplish-

¹³ Ibid., Vol.33, p.480.

ment of the concrete economic, political and cultural tasks that faced Soviet Russia in those years.

In that concrete historical situation it was necessary to wage a steadfast and stubborn struggle against displays of subjectivism and voluntarism. The increased danger of subjectivist and voluntarist distortions of Marxist theory in practice was, of course, not accidental. On the one hand, the revolution stirred up huge masses of the petty-bourgeois population. Drawn into the stormy process of revolutionary changes, they, naturally, could not but exert retroactive influence on the psychology and the mood of individual sections of the proletariat, could not but promote the growth of anarchist sentiments. On the other hand, insufficient experience and the absence of managerial skills impelled many young Soviet functionaries in the direction of armchair management and voluntarist decisions. Nor, lastly, should we forget that the tremendous successes registered in the first years of the socialist revolution at times blunted, among some of its participants, the sense of real possibilities, created the illusion that it was possible to accomplish literally all tasks of economic construction through "enthusiasm alone."

The practical experience of socialist construction smashed the subjectivist-utopian notions about an arbitrary leap into communism without creating the requisite material basis and without considering the real possibilities, solely with the help of arch-revolutionary slogans and moral preachments. A similar fate also befell the fatalist hopes for the automatic emergence of socialist social relations and a new consciousness, which is supposedly a mere derivative of the growth of productive forces. A proposition of Marxism-Leninism was confirmed, namely, that only in the process of fundamental revolutionary changes in social life and the building of the material basis of socialism, in the struggle against hostile class elements, is it possible to change social relations and people's consciousness, to ensure the victory of socialism.

The fundamental propositions of Lenin's teaching concerning the ways of building socialism and communism have been consistently embodied in the practical activities of the Communist Party and the Soviet people. On the basis of the Leninist approach to revolutionary theory, the Communist Party of the Soviet Union, jointly with the fraternal parties, continues creatively to develop Marxism-Leninism, to work out the new problems of the present epoch, the problems of the world communist movement and the building of communism. In so doing, Communists vigorously reject revisionist "innovations." Constructive endeavour in theory by no means consists in inventing new variants of Marxism different from the main conclusions of Leninism or supposedly replacing them by new ones but in effect by old revisionist ideas. Creative endeavour consists not in constructing various "models of socialism" and devising fashionable concepts which supposedly furnish a reply to the latest tendencies of social development but actually break with scientific communism. Communists see their cardinal theoretical duty in determining, on the basis of an analysis of changing realities, the new tasks in the struggle for communism, in finding new ways and forces for their accomplishment.

A Marxist-Leninist analysis also reveals the changes in the economy and structure of contemporary capitalism which create new possibilities for the revolutionary struggle. Contemporary state-monopoly capitalism, gigantically socialising production and centralising its management, aggravates to the extreme the contradictions between the monopoly top group and the huge masses of the working class and all working people.

The social consequences of the scientific and technological revolution, contrary to revisionist fabrications, lead not to a lessening but to the enhancement of the leading role of the working class, to the swelling of the ranks of its allies. Monopolising the achievements of scientific and technological progress, Big Business increasingly suppresses the middle strata of town and country. Scientific and techno-

logical progress determines the increase in the number of engineers and technicians and other strata of the intelligentsia. At the same time the exploitation of the main mass of the intelligentsia by capital is intensified. The struggle against the omnipotence and the arbitrary actions of the monopolies opens up possibilities for uniting the working class, peasantry, urban middle strata and intelligentsia against Big Business, which tramples upon their vital interests and rights.

In the new historical conditions Marxists have creatively developed Lenin's proposition about the diversity of forms of transition to socialism. The existence of the world socialist system, its decisive influence on the course of world history opens up new, wider possibilities for carrying out radical social reforms, for combining peaceful and non-peaceful means of struggle for effecting the socialist revolution in one country or another. At the same time the development of world socialism has shown that the teaching of the classics of Marxism-Leninism about the main general laws of building socialism and communism has withstood the test of time and has been corroborated by historical experience. The realities have justified Engels' forecast that, however different the ways of individual peoples of socialism are in detail, "the principles and aim of proletarian policy will everywhere be the same."¹⁴

The rise of national states in place of the former colonies and semi-colonies has introduced essential changes in the political structure of the world and has altered the correlation of forces to the detriment of imperialism. Today, national liberation movements have risen to a new stage of the active exploration for ways to develop further. Marx and Engels voiced the thought that countries at the pre-capitalist stage, benefiting from the example and support of countries where socialism has been victorious, would fully be able to shorten greatly the process of their development

¹⁴K. Marx and F. Engels, Works, 2nd Russ.ed., Vol.17, p.291.

towards socialist society. Lenin developed this thought and profoundly demonstrated the possibility of the non-capitalist development of such countries. Today, thanks to the existence of the world socialist system, the non-capitalist way of development has become much easier for young nations. In these countries, however, social changes are becoming the object of ever sharper struggle between the progressive forces of a socialist orientation and reactionary circles, which favour the strengthening of the capitalist structure and are inclined to reach agreement with imperialism.

The living dialectic of the translation of the possibility into reality is compatible neither with subjectivism nor with fatalism. This process is completed not in a spontaneous way but during the struggle of opposing social forces, and not according to the arbitrary wish of individual parties but depending on objective conditions. Such is the cardinal conclusion of the dialectical materialist theory of the historical process.

LENIN'S PLANS FOR ELABORATING THE THEORY
OF MATERIALIST DIALECTICS

Academician Bonifatii Kedrov

In his article entitled "On the Importance of Militant Materialism", Lenin set out the task of creatively elaborating materialist dialectics and mastering it. He saw this as the only way of overcoming idealism, agnosticism and downright religious obscurantism, whose advocates intensified their attacks on materialism in the early 1920s. Lenin sharply cut short the positivist tendencies which had then gained some currency in the country and pointed to the need for naturalists to provide a "solid philosophical grounding" for their scientific views.

The work on materialist dialectics, which Lenin decided to write, must have been started in 1914 and 1915, and recorded in his Philosophical Notebooks. It remains incomplete in the sense that it was not written in the form of a book for readers at large. Everything Lenin wrote in his Philosophical Notebooks was apparently meant, for the time being, for himself alone. This naturally raises the question about whether Lenin intended to write a special book on materialist dialectics and whether his Philosophical Notebooks were written in preparation of it. After all, we have no direct indications of this in Lenin's notes or any other evidence that he was indeed planning to write such a book. He may well have set himself a somewhat different task, that of elaborating materialist dialectics for his own theoretical work to be used in his subsequent research. That is a task he did fulfil.

What is the picture of Lenin's intentions we obtain from an analysis of his Notebooks? Special interest attaches to the last notebook containing the most important outlines of Lenin's plans for a systematic exposition of materialist dialectics, including the fragment entitled "On the Question of Dialectics", its first version. While the earlier notebooks contain full-scale summaries of the books Lenin read on philosophy, the last notebook clearly shows Lenin approaching the point of writing a book on materialist dialectics, as will be seen from his plans, above all the fragment "On the Question of Dialectics", where he discusses the question of how materialist dialectics should be set forth in systematic form and how, accordingly, it should be studied.

Let us assume, nevertheless, that Lenin intended to confine himself to a critical study of works on dialectics for his own purposes and never set the task of writing a special book on the subject. In that case we cannot understand why after his vast effort in studying the works of Hegel, Feuerbach and other philosophers, Lenin worked so insistently to draw up various plans for a systematic exposition of dialectics, and then went on to draw up the first outline of its exposition. It is natural to suppose that in 1914 and 1915 Lenin conceived the idea of a special work on dialectics and began to implement it, but was unable to complete it because the tempestuous historical events forced him to turn his attention to more urgent ideological, theoretical and practical question.

At any rate, what Lenin wrote in his Philosophical Notebooks cannot but leave the impression that this was preparation and arrangement of material for a planned work on dialectics and the start of its realisation. V. Adoratsky, the man who wrote the preface to the first publications of Lenin's Philosophical Notebooks in the Lenin miscellanies believes this to be true. Here is what Nadezhda Krupskaya, Lenin's wife, says in this context: "The advice which Vladimir Ilyich gives in his article on militant materialism

to the editors of the journal Pod znamenem marksizma (Under the Banner of Marxism), about how to work on Hegel's writings, contains an ardent, even if half explicit, desire to see that the work which he himself carried out in the sphere of philosophy and in popularising it should be continued by someone else. In the spring of 1922, Ilyich already felt that his strength was going and it was his wish that the work should not be dropped."¹

As a result we are left with a fairly strong conviction that Lenin did indeed begin to write a work on materialist dialectics and did not leave this hope later to continue and finish the work he had started. When it became clear that his hopes were apparently not to be realised, Lenin bequeathed the work he had started for others to continue. All of this sheds a new light on the origins of the article "On the Importance of Militant Materialism", which is justly regarded as Lenin's philosophical testament.

I should like to express a supposition about why Lenin had to interrupt his work on the book after he moved from Berne to Zurich in early 1916. Lenin's Philosophical Notebooks show that he was aware of the need for generalisations and "dialectical treatment" in that book not only of the history of philosophy but also of the history of individual natural sciences. In 1914 and 1915, he had had time to read a number of works on these questions and reviews of them. But during the First World War Lenin had little opportunity for such a vast undertaking as further philosophical generalisation of the results of the whole of modern natural science, especially of its history and the history of its individual branches. His attention was drawn to other vital questions of Marxist theory relating to an analysis of the substance of imperialism and the general prospects for the whole of historical development in the contemporary epoch, the doctrine of the state in its relationship to the

¹ N.K. Krupskaya, About Lenin, Moscow, 1971, p.59 (in Russian).

doctrine of revolution, the national question and many others. Considering that it was impossible to write a work on dialectics without a dialectical generalisation of the data of natural science and its history in the form in which Lenin had conceived it, to judge from Lenin's plans in the Philosophical Notebooks, Lenin apparently (this is, of course, nothing but a surmise on my part) had to put off the writing of a special book on dialectics for a more appropriate time. However, that is something that eventually never came about.

Although Lenin's work on dialectics remains incomplete, the ideas it contains were broadly applied in Lenin's subsequent writings both in the sphere of scientific research and in his guidance of practical revolutionary action.

Lenin's Approach to the Elaboration of the Theory of Dialectics

What kind of book did Lenin plan to write? It was, quite obviously, not intended to be a mere enumeration of the propositions and principles of dialectics illustrated with numerous examples from the most diverse spheres of the material world or scientific knowledge. Lenin flatly rejected this kind of scholastic approach to the exposition of any science, to say nothing of dialectics. Lenin believed that to reduce dialectics and its laws to a list of examples was to reject the principle of objectivity and switch directly to subjectivism and eclecticism. That is why he resolutely objected to the "identity of opposites" being taken "as a sum-total of examples", instead of "as a law of cognition (and as a law of the objective world)".² Lenin established this as one of the principles, or elements, of dialectics, formulating it as "the objectivity of consideration (not examples, not divergences, but the thing-in-itself)".³

² V.I. Lenin, Collected Works, Moscow, Vol.38, p.359.

³ Ibid., p.221.

In his work entitled "Statistics and Sociology", Lenin elaborated on this idea, showing why it was wrong and harmful to try to substitute a random collection of examples for scientific analysis. If one is to give serious consideration to a hard and complicated question, one needs to have precise and incontrovertible facts. "But how to gather the facts? How to establish their connection and interdependence? The most widely used, and most fallacious, method in the realm of social phenomena is to tear out individual minor facts and juggle with examples. Selecting chance examples presents no difficulty at all, but is of no value, or of purely negative value, for in each individual case everything hinges on the historically concrete situation. Facts, if we take them in their entirety, in their interconnection, are not only stubborn things, but undoubtedly proof-bearing things. Minor facts, if taken out of their entirety, out of their interconnection, if they are arbitrarily selected and torn out of context, are merely things for juggling, or even worse."⁴ An arbitrary selection of the facts produces a "subjective" concoction which will justify anything, instead of an objective interconnection of historical phenomena in their entirety.

That is not to say that Lenin altogether rejected the idea of adducing facts and examples in the course of scientific analysis. Separate examples (in the sense of individual concrete instances) are definitely necessary as material for comprehensive analysis, but not randomly selected facts, taken out of their overall context and interrelationship for purely illustrative (explicative) purposes. That is why Lenin said that the dialectics in natural science needs to be shown on the strength of any simple example. Such is the approach to the factual material in any branch of scientific knowledge where scientific theory has been adequately developed.

⁴ V.I. Lenin, Collected Works, Vol.23, p.272.

It appears that Lenin conceived a book on the theory of materialist dialectics or, as it is sometimes called, on Logic (with a capital L). The subject of dialectics and its whole content needs to be developed, brought out and traced in its own (intrinsic) logical connection. Lenin held that the most diverse factual sources, ranging from the history of philosophy and the history of the individual special sciences and ending with Marx's Capital and data from modern social life, especially the practice of the proletariat's revolutionary struggle, were to serve as concrete material for this kind of construction of materialist dialectics as a theory, as a system of categories, principles and laws.

But here the history of social thought and practice did not appear in its empirical form as given in history, but logically (dialectically) treated, that is, in a somewhat summarised general result of the path it has travelled, in its quintessence. Consequently, the question here is one of genesis of materialist dialectics, of its derivation from the whole sum-total of human knowledge, and also from human practice (including technology), with dialectics itself being taken by Lenin as logic and the theory of knowledge. In this instance, the basis is provided by a unity of the historical and the logical, with special importance attaching to Lenin's ideas about the dialectics of history and the logic of scientific cognition.

A question of exceptional importance is the method of exposition of the theory of materialist dialectics, considering that its reduction to a list of examples is being rejected in principle. This implies the use of the Marxist dialectical method of ascent from the abstract to the concrete. In application to any science this method is the ideal form for concretising the general principle of development.

Lenin's scheme was to apply the Marxist dialectical method to the exposition and study of dialectics itself.

That is exactly how the theory of materialist dialectics has to be set out today, and in no other way.

The theory of any science, including dialectics itself, implies the use of the relevant categories and concepts, the creation of their system, the bringing out of the links and transitions between them. This scientific task could be called the analysis of concepts. At present, we have an ever clearer picture of the highly complex task of making a conceptual analysis of the whole content of modern scientific knowledge, a task entailing the formulation of the modes for the proper operation with scientific concepts. Lenin believed it to be absolutely necessary to carry out such an analysis, especially in the theory of dialectics itself.

Finally, Lenin put forward some very important considerations about the structure of dialectics itself as set forth in the theoretical plane. This implies the bringing out of the core of dialectics and the further tracing of its development and concretisation. Giving a concise definition of dialectics as the doctrine of the unity of opposites, Lenin wrote: "This embodies the essence of dialectics, but it requires explanations and development"⁵ which Lenin partially gives in the fragment entitled "The Elements of Dialectics" following the definitions of it quoted above. The last of these elements (negation of the negation, transition of quantity into quality and the relationship between form and content) brings out the full core of dialectics, the "mechanism" of its functioning. The whole fragment "On the Question of Dialectics" deals with this development of the core of dialectics.

The method of ascent from the abstract to the concrete is connected with the question of the unfolding of contradictions, that is, directly with the core of dialectics; it is also connected with the question of the sequence of resolved and newly arising contradictions. Indeed, dialectics,

⁵ V.I. Lenin, Collected Works, Vol.38, p.223.

which brings out the internal contradictions inherent in the process of cognition appears as the method for exposing the epistemological and class roots of idealism. Thus, the emphasis is on the structural core of dialectics, which determines its elements and categories, and helps to substantiate their rational system, in which Lenin believed it necessary to connect the genetic and the structural aspects of materialist dialectics and to make compatible two of its universal principles: the principle of development and the principle of unity.

As a result, the theory of materialist dialectics was to appear, like the whole of Marxist philosophy, as being cast as a solid piece of steel, as Lenin put it.

Four of Lenin's Plans. Possibility of Realising Them

A thorough analysis of the Philosophical Notebooks suggests that while working on dialectics Lenin conceived at least four different plans for its systematic exposition.⁶ It may appear at first glance that these plans are not quite compatible with each other, but a deeper consideration shows that they are intrinsically coherent and contain the scheme precisely of an exposition of dialectics and its theory in which its genetic and structural aspects are developed consecutively, one after another, which means not in confrontation with each other, but in their mutual connection. The exposition of each of these two aspects of dialectics is preceded by the analysis of its individual elements or components.

Chronologically, the origination of Lenin's plans does not always correspond to the place the relevant range of the problems of dialectics being considered was to occupy in a consistent exposition of dialectics.

⁶ See V.I. Lenin, Collected Works, Vol.38, pp.221-222, 318-320, 353, 359-368.

The first is the plan recorded on page 100 of Lenin's Notebooks and entitled "Elements of Dialectics". This plan could be seen as an introduction to the structural exposition of dialectics as given in the fragment "On the Question of Dialectics". In "Elements of Dialectics" its structural parts are for the most part considered separately, but still not as part being deduced (developed) from their general core; only towards the end of the plan is there a sign of transition to their exposition starting from the core of dialectics. By contrast, the fragment "On the Question of Dialectics" is written from beginning to end from the standpoint of the development and derivation of the various aspects and problems from the core of dialectics. Thus, both of these plans are related in the same way as the introductory and the main part of the exposition of the theory of any science.

Similar is the relationship between the two other plans producing a genetic exposition of dialectics as a generalisation of the history of thought, the history of science and technology. The introductory part is represented by the plan written down by Lenin in his synopsis of Lasalle's book on Heraclitus. It follows almost immediately after the main plan of the same part of the work on dialectics which Lenin entitled "Plan of Hegel's Dialectics (Logic)". The first of these plans enumerates the sources ("the whole field of knowledge"), from the summary of which materialist dialectics was to have been derived: the history of the mental development of the individual (child) and its pre-history (animals), that is, "the history of cognition in general". Lenin also indicates the history of the development of the material basis for man's thought (language, sense organs) and says in conclusion: "These are the fields of knowledge from which the theory of knowledge and dialectics should be built".⁷ The second plan shows the relationship between the historical and the logical and is a direct

⁷ V.I. Lenin, Collected Works, Vol.38, p.353.

outcome of the former. Indeed, here the dialectical treatment of the history of human thought, science and technology is shown as a continuation of the work of Hegel and Marx. "In logic, the history of thought must, by and large, coincide with the laws of thinking."⁸ Hence this comparison: "The history of capitalism and the analysis of the concepts summing it up."⁹

Those are four of Lenin's plans which make it possible to draw up a general consolidated plan for the exposition of the theory of materialist dialectics. Is it possible today to realise this idea in accordance with this consolidated plan? An answer to this question apparently requires much preliminary research into Lenin's Philosophical Notebooks and all the plans so as to bring out the content of each and establish their connection and internal coherence.

The group on the theory of materialist dialectics which I head at the Institute of Philosophy of the USSR Academy of Sciences has been working on this for 14 years and has prepared a number of collective works which have been published in two series: "Dialectics and Logic" and "Dialectics--the Theory of Knowledge" showing the logical and epistemological functions of dialectics. Allied with these is another series, entitled "The Regularities of Natural-Science Development", which is being published by the Institute of the History of Natural Science and Technology of the USSR Academy of Sciences. Two books--a collective work, entitled "Lenin on the Elements of Dialectics" (1965) and my own work, entitled "From the Laboratory of Lenin's Thought" (1972)--could be regarded as direct preparation for a work on the theory of dialectics.

The preliminary work carried out by my group at the Institute of Philosophy ended with the compilation (on the basis of a merger of Lenin's four plans) of a detailed con-

⁸ Ibid., p.318.

⁹ Ibid., p.320

solidated plan on the theory of dialectics. Here it is in full.

Dialectics

(An Essay in Realising Lenin's Plans on the Theory of Dialectics)

Introduction: (a) two-fold approach to dialectics: genetic (sources of dialectics) and structural (the core of dialectics and its unfolding); (b) general definition of dialectics as the doctrine of development, including the development of human cognition; (c) the question of truth as the central question of dialectics (logic); (d) the role of practice in the process of cognition; (e) Marx's dialectics as opposed to Hegel's dialectics; (f) Lenin's role in elaborating the theory of materialist dialectics.

Part I. Dialectics as a generalisation of the history of thought.

(Genesis of dialectics).

BOOK I. THE HISTORY OF THOUGHT AS A SOURCE OF DIALECTICS.

(Plan from the synopsis of Lasalle's Heraclitus).

Section 1. Phylogeny of worldwide human thought: (a) history of philosophy (including the philosophy of Ancient Greece as its embryo); (b) history of the individual sciences.

Section 2. Ontogeny of individual human thought: (a) history of the mental development of animals; (b) history of the mental development of the child; (c) psychology.

Section 3. Material basis of the phylogeny and ontogeny of human thought: (a) history of language; (b) physiology of sense organs and brain.

BOOK II. DIALECTICS OF THE HISTORICAL AND THE LOGICAL.
(Plan of Hegel's Dialectics [Logic]).

Section 1. General course of human cognition: (a) immediate phenomena; (b) their substance; (c) their cognition.

Section 2. Categories of dialectics as stages in man's cognition and activity: (a) categories relating to immediate phenomena; (b) categories relating to substance; (c) verification by practice and categories connected with it, active role of consciousness.

Section 3. The logic of Capital: (a) the unity of logic, dialectics and the theory of knowledge of materialism in Capital; (b) history of capitalism and analysis of the concepts summing it up; (c) two-fold analysis and verification by facts, by practice.

Part II. Dialectics as the doctrine of the unity of opposites.

(Structure of dialectics).

BOOK III. ELEMENTS OF DIALECTICS

(Fragment "Elements of Dialectics").

Section 1. Objectivity of dialectics: (a) thing itself and its development; (b) thing itself and its relationships.

Section 2. Essence of dialectics: (a) internal contradictions; (b) transformations and transitions; (c) repetitions and returns.

Section 3. Dialectics of cognition: (a) infinity of cognition; (b) contradictory nature of cognition.

BOOK IV. THE CORE OF DIALECTICS.

(Fragment "On the Question of Dialectics").

Section 1. The unity of opposites as the source of all development: (a) the unity of opposites as the essence of dialectics; (b) relationship between the relative and the absolute.

Section 2. Method of ascent from the abstract to the concrete: (a) method of ascent in Capital; (b) method of

ascent in dialectics; (c) the "cell" of thought (science) and its development.

Section 3. Cognition as a series of circles: (a) "circles" in philosophy; (b) application of dialectics to the theory of reflection; (c) dialectics exposing the epistemological and class roots of idealism.

Conclusion: (a) unification of the two principles of dialectics: unity of the world and development of the world; (b) resultant definition of dialectics as the theory of knowledge of materialism and logic; (c) importance of Marxist dialectics for science and revolutionary activity.

The question of the initial material that should be subjected to dialectical treatment and generalisation is decisive in producing a work on the theory of materialist dialectics. Apart from those indicated by Lenin in his Philosophical Notebooks and in his article "On the Importance of Militant Materialism", the group of the theory of materialist dialectics now also includes the following material:

First, data from modern socio-historical development, the international revolutionary movement, the construction of socialism and communism in the USSR and other countries of the socialist camp, the national liberation movement, and the collapse of the colonial system. Second, all of Lenin's own works in which materialist dialectics is applied in a masterly manner, creatively developed and concretely applied to the solution of the most diverse problems; an invaluable source for the elaboration of the theory of dialectics is also the material of the International Meetings of Communist and Workers' Parties, Congresses of the CPSU and decisions of the CPSU Central Committee. Third, the wealth of data produced by the development of the whole of modern science, including the rapidly developing natural sciences, where the latest revolution organically blended with the revolution in technology in one tempestuous process of the modern scientific and technical revolution, a process

which testifies to the materialisation of the ideal -- (science). Finally, fourth, the criticism of various trends in present-day bourgeois philosophy and Right and "Left" revisionism, should be considered in a work on the theory of dialectics, whenever the criticism has involved the dialectical approach and the use of dialectical methods.

As I have stressed above, all this material should be used not by extracting separate scraps of data illustrating dialectics but by making a comprehensive analysis of the phenomenon being studied as a whole, with constant returns to it for the purpose of bringing out the dialectic latent in it to the fullest and deepest extent.

Such a work on the theory of dialectics written today would be a direct continuation of the vast effort put in by Lenin, an effort which it was his bequest to his associates and followers to complete.

But in preparing a work on materialist dialectics in 1914 and 1915, Lenin proceeded directly from Hegel's works, reworking the dialectics they contained in the light of materialism. That is exactly the way, relying on his own experience, in which he recommended in 1922 that Marxist philosophers and leading naturalists should advance in studying Hegel's dialectics, converting it into materialist dialectics, enriching it with philosophical generalisations from socio-historical practice and advances in natural science, and also demonstrating the concrete application of dialectics in Capital and other works of Marx's.

Today we find ourselves in an incomparably better situation: we are in a position to start directly not from Hegel's works but from the gigantic work done by Lenin in the materialist treatment of Hegel's dialectics as recorded in his Philosophical Notebooks. Hence the origin of the main idea--to try to realise in our day the plans which Lenin drew up in his lifetime, and to do this by filling them with modern philosophically generalised (socio-historical and

scientific) material with extensive reference to all of Lenin's major works.

The superficial critic, who is in the habit of drawing general conclusions and delivering categorical assessments without giving serious thought or making a profound analysis of the views he condemns, having taken a short look at the plan set out above, and without reading the explanatory text that goes with it, would hasten to draw the final (and naturally quite erroneous) conclusion to the effect that in the exposition of dialectics we propose to confine ourselves chiefly or even exclusively to the Philosophical Notebooks, discarding all the rest in general. A wrong impression from a superficial approach may be produced by the fact that all the titles in the draft plan have been taken verbatim from Lenin's plans in his Philosophical Notebooks. However, it is not the titles that matter, but the content behind them which is to fill this structural scheme. That is the content to which the serious critic will turn his attention, while the superficial one will concentrate on the titles. On that "ground", the superficial critic may level all manner of ideological and theoretical accusations at our group, having failed altogether to see the gist of the matter. Indeed, he may well try to accuse us of having ignored the whole aggregation of Lenin's works, all the dialectics contained in these works, and of separating these from his Philosophical Notebooks in an effort to connect dialectics only with a clarification of the attitude to Hegel's legacy, and so on and so forth. As a result, there may well be charges of marking time and efforts at reversing the trend of development, charges of typical dogmatism and quotation-mongering, and of philosophical scholasticism out of touch with life. To avoid this, we urge the reader to read not only the outline plan we have proposed, but also the text that goes with it.

Let us add that the plan we have proposed for a work on a dialectics is no more than an essay in realising Lenin's plans on the theory of dialectics. Our group has set itself

the task of setting forth the theory of dialectics in accordance with our own plan drawn up on the strength of Lenin's recommendations by way of ascent from the abstract ("cell" of the object) to the concrete (developed object). The book is to have the following title: Dialectics. System and Theory. This is a work of exceptional difficulty and complexity, but by writing such a work the present generation of Marxist philosophers and historians of science and technology will be able to demonstrate in practice their understanding of and their response to the tasks set in Lenin's article "On the Importance of Militant Materialism" half a century ago.

The purpose of Lenin's "Philosophical Notebooks" was to arm the revolutionary proletariat and its party with a true ideological and theoretical weapon, materialist dialectics, which is the "soul" of the entire Marxist doctrine. But the turbulent flood of events prevented Lenin from consummating his work and imperatively directed his attention to the keenest theoretical and politically important questions, namely, an analysis of the substance and historical prospects of imperialism, from which stemmed the question of the possibility of socialism's victory first in one, singly taken country; further elaboration and defence of the Marxist doctrine of the state and revolution, the dictatorship of the proletariat; the national question, which became especially acute during the First World War and the related problem of proletarian internationalism in conditions in which the parties of the Second International betrayed this great principle and succumbed to chauvinism.

Although the work on materialist dialectics as such remained uncompleted, the ideas elaborated by Lenin in the Philosophical Notebooks were practically and widely applied in examining the enumerated problems which arose prior to 1917 and later on, in the course of the revolution in Russia and the years of struggle for Soviet power and the beginning of the building of socialist society. Dialectics invariably was the "soul" of Lenin's entire theoretical and

practical work in guiding the Soviet state, although actually he no longer succeeded in elaborating it philosophically; there was too much current work, too little time remained for purely theoretical activity in general to allow him fully to immerse himself in the sphere of philosophy even for a brief period.

Later on, Lenin widely utilised and further developed the materialist dialectics elaborated in the Philosophical Notebooks as a method of scientific study and as a guide to practical revolutionary action. This was done in Imperialism, The Highest Stage of Capitalism (1916) where he continued the analysis of the laws of capitalist society's development made by Marx in Capital, and then in The State and Revolution (1917) dealing with a very keen and intricate question of socio-political life at that time, in the works of the first years after the October Revolution, especially "The Immediate Tasks of the Soviet Government", where dialectics is embodied and developed in an analysis of the concrete problems which faced the Soviet Government and the Bolshevik Party. In this respect special mention should be made of "Left-Wing" Communism, an Infantile Disorder (1920), which was of exceptionally great importance for solving problems of the international communist movement.

On the centenary of the birth of Frederick Engels Lenin published an article "The Marx-Engels Correspondence", where he forcefully emphasised that dialectics was the focus of the entire correspondence, the central point in which the ideas they voiced and discussed converged. The application of materialist dialectics to the reworking of the entire political economy, history, natural science, philosophy, policy and tactics of the working class--this, as Lenin pointed out, was what interested Marx and Engels most of all, and it is here that they made their most important contribution, their brilliant step forward in the history of revolutionary thought.

During the years of the New Economic Policy, Lenin wrote a number of important works especially "Once Again on the Trade Unions, the Current Situation and the Mistakes of Trotsky and Bukharin" (1921), in which he particularly characterised the essence of Marxist dialectics, Marxist dialectical logic, in their antithesis to the metaphysics of Trotsky and eclecticism and formal logic of Bukharin.

Lenin's constant recourse to Marxist dialectics greatly influenced the ideological and theoretical schooling of the Party members and the entire working class and also representatives of other social groups which were allied with it in our country. But, let us recall again, Lenin, engrossed in the titanic work of guiding the Soviet state and the Party, could not pay much attention to special theoretical activity, including the propaganda of Marxist dialectics. After the victory of the October Revolution and especially after the end of the Civil War this task had to be undertaken by special groups of propagandists of Marxism and special theoretical journals.

In the first months after the Revolution no Marxist theoretical journals were published in our country. Publication of the Plamya (Flame) journal was started in Petrograd on May 1, 1918, with A. Lunacharsky as the editor. It laid claim to the role of a journal of wide ideological range which also had to cover questions of Marxist philosophy. But the staff and contributors could not provide articles on philosophical subjects at a sufficiently high Marxist level. The journal existed up to the end of 1920, having played a definite positive part above all in the sense that it revealed an interest in philosophical subjects among a wide readership, especially young people.

During the first three years after the October Revolution the Communist Party and the entire working class of the country were too preoccupied with the defence of the revolution from military intervention and internal counter-revolution to devote sufficient forces and resources for develop-

ing work in the philosophical sphere. But even in these exceptionally difficult conditions a Socialist Academy was opened on the initiative of Lenin in 1918, and in 1919 the Communist University named after Sverdlov was set up to train Party cadres who received the necessary knowledge in theory and practical activity (in 1920 almost the entire graduating contingent of the six-month courses of the Sverdlov University went directly to the front, to defeat Wrangel).

With the transition to peaceful construction the need in personnel, trained not only practically but also theoretically, sharply rose. Without the profound knowledge of Marxism it was difficult for Party members engaged in practical work to orientate themselves in the involved and highly contradictory historical conditions in the first years of the New Economic Policy. Discussions flared up constantly in the Party, ideological and political vacillations were displayed to definite groups within the Party which had joined it earlier, but adhered to positions that were far from Marxist. All this imperatively demanded that the Party pay due attention to theoretical questions, their discussion and elaboration as applied to the new historical conditions.

Hence it was not accidental that a year after stopping the publication of Plamya, which had been unable to cope with the functions of a Marxist theoretical periodical, a new journal was launched Pod znamenem marksizma (Under the Banner of Marxism). That was an answer to the present-day demand of life itself.

It seemed natural that the journal which urged its readers and authors to rally under the banner of Marxism should place in the centre of its future activity the elaboration of the "soul" of the entire Marxist doctrine, i.e., materialist dialectics, and the entire range of problems both in the general theoretical aspect and in the aspect of applying it as a scientific method to analysing concrete questions of contemporary revolutionary activity and all historical reality.

But neither the editors of the new journal nor the men who laid claim to indicating the road to the journal and drawing up its programme and contributed to it uttered a single word about materialist dialectics. As though by agreement they steered clear of this cardinal and decisive question. They wrote and talked about everything but dialectics, the "soul" of Marxism.

Lenin who splendidly understood the tasks of the new journal and the need for its publication could not fail to notice so important a gap in the very first, programme, issue of the journal. That is why he contributed to the next number (the third, the first was a double issue) an article which became a programme document for all subsequent activity of Marxists in the realm of philosophy. The question of dialectics is central in Lenin's article "On the Significance of Militant Materialism". From the very outset Lenin sought to rectify the flagrant theoretical omission on the part of the editors of the new journal. But before examining how Lenin rectified the line charted by the journal and brought it into conformity with the major propositions of Marxism it is necessary, at least briefly, to ascertain what that omission or distortion was.

How the Question of Dialectics Was Evaded
in the First Issue of the Journal and Why
This Was a Flagrant Omission

Two articles first of all drew Lenin's attention in No.1-2 of Pod znamenem marksizma: the leading article "From the Editors" and a review of Albert Einstein's book on the theory of relativity written by Prof. A. Timiryazev.¹⁰

The leading article "From the Editors" was amazingly banal, although at first glance it seemed to raise big and important problems. It set out with a declaration that "we

¹⁰ A Soviet physicist, son of the renowned Darwinist biologist K.A. Timiryazev (1843-1920).

are marching under the banner of orthodox Marxism" and that "not all who united round our journal are Communists", that "we are united by the community of our philosophical world outlook: all of us are consistent materialists". Lenin underscored this place, showing its fundamentally great importance in formulating the Party's strategical line in ideological and theoretical work. Further, defining the tasks of the journal, the editors stated that "we do not strive to be researchers who contemplate and study from afar the development of ideas, the struggle of class forces and tendencies in our society, but, on the contrary, we are fighters", and therefore, "our journal is a journal of struggle for the materialist world outlook". At the end of their statement the editors spoke even more definitely; "It is high time for us, in face of the ever greater disintegration in the enemy camp, to unfurl the banner of militant materialism".

Thus, the editors clearly voiced their credo: to wage an energetic struggle for materialism, to be militant, consistent materialists. But they lost sight of the cardinal condition for achieving this aim. This condition is the need to be dialectical materialists because only in alliance with dialectics does materialism become consistent to the end. Only dialectics, being materialistic, can make materialism militant and equip it for struggle against eclecticism, against the "ideological disarray prevailing among the bourgeois intelligentsia", against opportunism, against pessimism and mysticism. The need for such a struggle was mentioned in the article "From the Editors" in the first issue of the new journal.

What stands out at once in the review of Einstein's book on the theory of relativity contributed by A. Timiryazev is a flagrant gap, the complete lack of knowledge and failure to understand materialist dialectics, its replacement by positivism, covered up by references to Marxism, to its propositions contained in Lenin's Materialism and

Empirio-Criticism, the second edition of which had been published 18 months earlier.

The utter philosophical helplessness of the reviewer is revealed by his attempt to bring out the reasons why idealistic philosophical conclusions are drawn from Einstein's theory. "Why is it," he asked, "that in a healthy science where, as Comrade Lenin points out, a scientist spontaneously becomes a materialist, such unhealthy trends arise? There can be only one answer: questions connected with the theory of relativity pertain to spheres where we with our technical facilities are not yet capable of solving matters by laboratory experiments. And where the natural scientist is deprived of his sole reliable mainstay his mind easily, very easily can wander astray."

According to Timiryazev, a scientist should operate only with theoretical propositions which can be verified by laboratory experiments; he must not go into the sphere of theoretical abstractions (among them, by the way, is all of dialectics which deals with scientific abstractions and accustoms scientists to operate with them); in that case a scientist automatically, "spontaneously" will find himself on the positions of materialism. Laboratory experiments, according to Timiryazev, is the sole reliable mainstay of materialism. Deprived of this mainstay, a scientist can very easily slip down to idealism.

Neither a conscious upholding of consistent philosophical materialism as a scientific world outlook nor any dialectics is mentioned here. The book Materialism and Empirio-Criticism, to which Timiryazev referred, was not understood at all by him or, worse than that, was understood wrongly. He apparently thought that no idealism was a threat to a scholar who competently studied the experimental natural sciences, adhered to positions of spontaneous materialism and voiced thoughts which fully tallied with ordinary "common sense".

Materialist dialectics was thus avoided in two articles of the first issue of the new journal. Their authors, as though by common consent, called to fight for materialism, not for Marxist, dialectical, but for primitive or spontaneous materialism, assuming that this already guaranteed victory over any idealist reactionary views, over attempts to restore the bourgeois world outlook. The enlightening materialism they extolled suited the authors of these articles. They held that the mere proclamation of the need to fight against the idealist and religious world outlook sufficed for defining the fundamental line of the new Marxist journal.

That is why Lenin thought it necessary to contribute an article expounding a real, vitally urgent programme of philosophical work in a country where the proletarian revolution triumphed. This is what Lenin wrote: "I should like to deal with certain questions that more closely define the content and programme of the work which its editors have set forth in the introductory statement in this issue."¹¹ This desire of Lenin to define more closely the content and programme of the work along the lines of militant materialism showed that Lenin was not satisfied with the material published as leading and guiding in the first issue of the new journal. To define more precisely the content and programme of work meant, according to Lenin, to rectify the line wrongly charted by the journal and above all to place in the centre of attention materialist dialectics, fully omitted and avoided both by the editors and A. Timiryazev.

But ideological and theoretical dissatisfaction was merely a direct pretext for writing "On the Significance of Militant Materialism". The need for such a programme article was very pressing at that time and followed from the entire intricate situation on the ideological front in the early 1920s. One of the factors which demanded greater attention to the Party's theoretical work was that during the years of

¹¹ V.I. Lenin, Collected Works, Vol.33, p.227.

the Revolution and the Civil War the Party was joined by very many new members who had no ideological and theoretical schooling. They passed through the crucible of struggle for the victory of the proletarian revolution, defending it from imperialist intervention and internal counter-revolution. But, with rare exceptions, they were unable to receive a systematic Marxist education. And the "soul" of this study has been and will be materialist dialectics, the "soul" of the entire Marxist doctrine. That is why it was vitally necessary to put forward the study and mastery of dialectics as the main programme, which Lenin did in his article.

The other factor which also demanded the advance of dialectics to the forefront of the Party's entire ideological and theoretical work was that at the beginning of the 1920s persons who laid claim to the role of Party's theoreticians, but actually were far removed from Marxism, made increasingly frank and energetic attempts to replace dialectics by eclecticism, voluntarism, metaphysics and formal logic. This was clearly demonstrated by the discussion on the trade unions held in 1921. Lenin resolutely criticised such attempts in his work "Once Again on the Trade Unions, the Current Situation and the Mistakes of Trotsky and Bukharin".

It was in the early 1920s that Bukharin with his "theory of equilibrium" and obvious liking for the Machism of A. Bogdanov, stepped up his activities in the theoretical sphere. He published a book The Theory of Historical Materialism where dialectics was replaced by mechanicism, and historical materialism--by vulgar sociology. Similarly in the book The Economy of the Transition Period Bukharin put in place of Marxism and dialectics Bogdanov's schematism and scholasticism.

To blast such anti-Marxist concepts which, in effect, expressed revisionist tendencies inseparably linked with the general political concepts of Trotskyism, on the one hand, and the Right-wing trend in the Party, on the other, it was

necessary further to sharpen the main ideological and theoretical weapon of Marxism, its dialectics. This was the purpose of the programme of the new journal which Lenin put forward in his article.

Lastly, this was also dictated by both the international situation and the atmosphere within the country where open enemies of Marxism and frank advocates of the bourgeois world outlook became more active. "Smenovekhovstvo"¹² in politics, hope that Soviet power would perish unable to cope with the economic difficulties facing it, that the shoots of socialism would be stifled by the petty-bourgeois spontaneity of the commodity economy, was combined with statements by ideologists of the bourgeoisie and their echoes on questions of philosophy and the natural and social sciences. Typical in this respect was the publication of a collection dealing with the theory of relativity. The authors of this collection were the selfsame Machists whom Lenin routed in Materialism and Empirio-Criticism. Now they clutched at the theory of relativity in order to "refute" with its help materialism in general, and dialectical materialism in particular.

Such was the direct reason for Lenin's writing "On the Significance of Militant Materialism"; such were the deeper reasons for this, which followed from the entire situation at the beginning of the 1920s.

¹² Smena Vekh (Change of Landmarks) - the title of a collection of articles as distinct from the collection entitled Vekhi (Landmarks, Moscow, 1909), published in Prague, and then the name of a journal published in Paris from October 1921 to March 1922. It was the mouthpiece of advocates of a socio-political trend that emerged chiefly among Russian emigré intellectuals who called for cooperation with the Soviet government, hoping for bourgeois regeneration of the Soviet state and the Communist Party. A certain revival of capitalist elements in Soviet Russia following the promulgation of the New Economic Policy served as the social foundation for this trend. - Ed.

Elaboration of Materialist Dialectics as the
Central Task Set by Lenin

In rectifying the wrong line marked out in the first issue of Pod znamenem marksizma, Lenin naturally put to the foreground the task of creatively elaborating materialist dialectics and mastering it. Only in this way did he see the possibility of overpowering the philosophical enemy—idealism, agnosticism and fideism (clericalism) — which early in the 1920s particularly stepped up its attacks on materialism. Directly replying to the positivist principles of A. Timiryazev, Lenin wrote that "it must be realised that no natural [meaning also experimental -- B.K.] science and no materialism [meaning also spontaneous -- B.K.] can hold its own in the struggle against the onslaught of bourgeois ideas and the restoration of the bourgeois world outlook unless it stands on solid philosophical ground. In order to hold his own in this struggle and carry it to a victorious finish, the natural scientist must be a modern materialist, a conscious adherent of the materialism represented by Marx, i.e., he must be a dialectical materialist."¹³

The "solid philosophical ground", to which Lenin referred, presupposes the mastery of materialist dialectics and the ability to use it. It must be noted that Lenin begins to lead the reader to such a conclusion from the very first pages of his article. He draws on dialectics and steadily applies its principles when he demonstrates the need for an alliance of Communists with non-Communists who are consistent materialists and, in general, when he explains how the revolutionary vanguard must lead the masses. Lenin utilises dialectics in formulating the programme of atheistic work and substantiating the principle of the partisanship of philosophy (although this expression is not used in this part of the article).

¹³ V.I. Lenin, Collected Works, Vol.33, p.233.

Dialectics is not directly named by Lenin in the first part of the article, but it is all the time in the focus of his attention. When he goes over to the natural sciences, however, he directly refers to it. It is the mastering of dialectics that is regarded by Lenin as the main aim of the alliance he conceived between Marxist philosophers and progressive natural scientists.

"Modern natural scientists (if they know how to seek, and if we learn to help them)," Lenin writes, "will find in the Hegelian dialectics, materialistically interpreted, a series of answers to the philosophical problems which are being raised by the revolution in natural science and which make the intellectual admirers of bourgeois fashion 'stumble' into reaction. Unless it sets itself such a task and systematically fulfils it, materialism cannot be militant materialism. It will be not so much the fighter as the fought, to use an expression of Shchedrin's. Without this, eminent natural scientists will as often as hitherto be helpless in making their philosophical deductions and generalisations."¹⁴

Why is this so? Because any materialism and atheism, if it is not equipped with dialectics, is incapable of coping with the highly sophisticated methods of struggle employed by idealism. In this context it is important to stress the direct link-up between Lenin's thoughts which underlay his article in 1922 and the thoughts he conceived in 1914-1915 when he worked on his Philosophical Notebooks. The direct connection between both these works passes above all along the line of dialectics. As pointed out earlier, the 1922 article expounds the thought that the onslaught of idealist reaction can be withstood only by dialectical materialism fully equipped with the dialectical method. Any other materialism, for example, natural-scientific and spontaneous,

¹⁴ V.I. Lenin, Collected Works, Vol.33, p.234.

inevitably will suffer defeat and will not be able to overpower its philosophical adversary.

The same thought only in a different context was expressed by Lenin in the Philosophical Notebooks. Here is an excerpt from his conspectus of Hegel's book Lectures on the History of Philosophy: "That the universal should in philosophy be given a place of such importance that only the universal can be expressed, and the 'it' which is meant, cannot, indicates a state of consciousness and thought which the philosophical culture of our time has not yet reached."¹⁵ Lenin points out further that Hegel placed among the men who have not attained the philosophical culture of the time also those who said that sensory cognition is the truth, because, you see, the sensory is something universal. On this score Lenin remarks: "Thereby Hegel hits every materialism except dialectical materialism."¹⁶ The conclusion is that here, too, to defeat idealism one must be a dialectical materialist.

This is how Lenin's ideas, written at different times but organically interconnected, resounded in unison almost a decade later.

The task of studying and mastering dialectics, set by Lenin, is the quintessence of the entire article "On the Significance of Militant Materialism". He concretises this task demanding that it is essential to "arrange for the systematic study of Hegelian dialectics from a materialist standpoint, i.e., the dialectics which Marx applied practically in his Capital and in his historical and political works, and applied so successfully that now... every day of the awakening to life of new peoples and new classes serves as a fresh confirmation of Marxism."¹⁷

¹⁵ Ibid., Vol.38, p.277.

¹⁶ Ibidem.

¹⁷ Ibid., Vol.33, p.233.

Lenin served warning that such a study, such an interpretation and propaganda of Hegelian dialectics was exceedingly difficult and that the first experiments in this direction would involve mistakes. "But only he who never does anything never makes mistakes," Lenin declared. These words were recalled more than once in later years. Unfortunately, the men who shouted loudest of all about the mistakes made in studying and materialistically interpreting Hegelian dialectics were those who themselves made no mistakes only because they had done nothing positive in this sphere but specialised in finding and, still more often, in inventing mistakes of others.

Lenin, evidently recalling how he himself fourteen years earlier had worked over Hegelian dialectics, states in his article: "Taking as our basis Marx's method of applying materialistically conceived Hegelian dialectics, we can and should elaborate this dialectics from all aspects, print in the journal excerpts from Hegel's principal works, interpret them materialistically and comment on them with the help of examples of the way Marx applied dialectics, as well as of examples of dialectics in the sphere of economic and political relations."¹⁸

This is exactly the way Lenin studied dialectics in the works of Hegel, as attested to by both his Philosophical Notebooks and the reminiscences of Krupskaya.

Lenin's attitude to the theory of relativity and its author can furnish a good example of how it is necessary, from positions of materialist dialectics, to approach and assess the achievements of modern science. Although Lenin was not a specialist in physics, but, mastering to perfection the method of materialist dialectics, he discerned, through the fog of A. Timiryazev's "critique", the true

¹⁸ Ibid., p.234.

dialectical and materialist content of this theory. That is why he placed it in one rank with such great discoveries of physics as that of radium and put Albert Einstein among the "great reformers of natural science since the end of the 19th century".¹⁹

Thus, Lenin could not but notice that the theory of relativity declares, first, that there must be a dependence and mutual influence between space and time, and, second, that space and time themselves as the main forms of all being, must depend on their material content, i.e., on the motion of matter. It is these two propositions that follow in one or another way from the general principles of dialectical materialism: since both space and time are different forms of one and the same being, of one and the same matter in motion which comprises what is called the world, both these forms cannot be external, independent in relation to each other, to the motion of matter and to matter itself, as Newtonian mechanics taught.

The theory of relativity deduced these propositions on the basis of purely physical (metric) considerations, which A. Timiryazev and his followers, mechanicians, have never understood. Quite the reverse, materialist dialectics helped Lenin to penetrate the philosophical essence of the question.

Concrete Problems of Dialectics to Be Elaborated,
According to Lenin

Guided by what Lenin said about dialectics and the ways of applying it in studying theoretical problems, including its own problems, one can outline a concrete plan of work in this sphere. In the recent past, and not infrequently today, too, the exposition of dialectics has been reduced to a mechanically scholastic selection of examples as illustrations to some or other propositions of dialectics or to a no

¹⁹ Ibid., p.233.

less mechanically scholastic sticking philosophical terms onto the material of particular sciences. The untenability of such methods has been convincingly demonstrated with references to the views of Lenin who always resolutely spoke up against reducing dialectics and its laws to a sum of examples. An analysis of concepts may be named among the concrete problems and tasks facing dialectics in the natural sciences.

In view of the wide use in science of formal and mathematical methods of study, which by itself is undoubtedly a progressive process, there are tendencies to evade an analysis of the content of the categories and concepts of modern science and to confine oneself to a system of symbols and conventional designations. With such an approach the major task of dialectics in scientific thinking--the use of concepts--is relegated to the background or is even removed completely.

Yet, there arises with increasing clarity the immeasurably more important and interesting, although incomparably more difficult, task of a conceptual analysis of the entire content of modern natural science in order to work out methods of properly operating with modern scientific concepts. And this must be done bearing in mind Lenin's words: "Dialectics in general is the 'pure movement of thought in Notion's [here Lenin quotes Hegels' words - B.K.] (i.e., putting it without the mysticism of idealism: human concepts are not fixed but are eternally in movement, they pass into one another, they flow into one another, otherwise they do not reflect living life. The analysis of concepts, the study of them, the 'art of operating with them' [Engels] always demand study of the movement of concepts, of their interconnection, of their mutual transitions)." ²⁰ Elsewhere, replying to the question "What is dialectics?" Lenin pointed out that it consists in disclosing the interdependences and transitions from one into the other of all concepts without

²⁰ V.I. Lenin, Collected Works, Vol.38, p.253.

exception, in the relativity and identity of opposites between concepts, in that "every notion occurs in a certain relation, in a certain connection with all the others".²¹

All these Leninist propositions have to be concretised in every individual case in applying materialistically interpreted Hegelian dialectics, i.e., materialist dialectics, to natural science and its history.

Another problem and task facing dialectics is the relationship of the historical and the logical. Special importance attaches in this context to Lenin's ideas pertaining to the dialectics of the history and logic of scientific cognition of unity. From the relationship of the historical and the logical, from their unity, according to Lenin, it is possible and necessary to deduce dialectics as the logic and theory of cognition. What is needed is "the history of thought from the standpoint of the development and application of the general concepts and categories of the Logic",²² Lenin wrote. Since the general course of all human knowledge, of all science in general proceeds strictly dialectically, "Insofar Hegel's dialectic is a generalisation of the history of thought,"²³ Lenin noted. From this follows the general task set by Lenin in its full magnitude: "Continuation of the work of Hegel and Marx must consist in the dialectical elaboration of the history of human thought, science and technique".²⁴

Lenin analyses the question of the relationship of the historical and the logical in the epistemological light, too, when he links it with the question of truth. "Truth is a process. From the subjective idea, man advances towards objective truth through 'practice' (and technique)."²⁵ Here truth itself is interpreted by Lenin from the historical

²¹ Ibid., p.197.

²² Ibid., p.177.

²³ Ibid., p.318.

²⁴ Ibid., pp.146-147.

²⁵ Ibid., p.201.

angle as the movement of knowledge. The same idea, only in a different context, was expressed by Lenin in the proposition that the question of truth is the crux of logic (Lenin puts a sign of equality between the question of truth and logic).

The task of creatively elaborating dialectics on the basis of the unity of the historical and the logical is immense in scale and difficult to accomplish. It demands the summing up of the entire history of natural scientific thought (if it is a matter of natural science and its historical development).

This task concerns Marxist philosophers, modern natural scientists and the historians of science and technology. Work in this direction could help formulate a general platform for further extending the alliance between them and making it richer in content and more creative. This is an exceedingly intricate task. As a matter of fact, Soviet scientists are only approaching it. But it is undoubtedly correct that the history of knowledge, the history of science cannot be elaborated outside the logic of knowledge, the logic of science and, conversely, logic must not be taken abstractly, in a formal way, outside the history of human thought. Scientific quarters in different countries are beginning to think this way. Thus, the idea of the need for bringing closer together studies of the history of science and the logic of science was voiced and energetically supported at two international congresses in 1971: at the 13th Congress on the History of Science in Moscow and at the 4th International Congress on the Logic, Methodology, and Philosophy of Science in Bucharest. Dialectics inexorably compels scientists to take it into account, because without dialectics it is impossible to raise and solve urgent problems of modern science and its history.

Let us mention one more problem or task facing dialectics in the natural sciences. This is the further elaboration and application of the Marxist dialectical method of ascend-

ing from the abstract to the concrete. Of what value is this method for any science, including any branch of the natural and mathematical sciences? Its value lies in that it serves, in an ideal form, as a reflection of the general principle of development as applied to the task of giving a logically consistent exposition of the content of the given science. Just as the studied object itself makes the ascendancy from the lowest levels of its being (from its "cell") to ever higher stages in its development, so in a systematic mental reproduction of the process of its development, i.e., in an idealised form, the method of ascendancy in a generalised form reveals the same sequence of the stages of the given process.

In this way the natural sciences are now expounded which rely on direct experiment and its theoretical generalisation, and the deductive mathematical sciences which reproduce in an idealised form the process of cognition of one or another aspect of the object world singled out in an abstract form.

Lenin's idea was to apply the Marxist dialectical method to the exposition and study of dialectics itself. It seems very strange that all the developed sciences, without exception, actually rely on the method of ascendancy from the abstract to the concrete in presenting their content, in summing up the results of studying their object, while materialist dialectics as a science (and it undoubtedly is a genuine science in the strictest sense of this word) for some unknown reason must be expounded not according to this, its own method, but in some other way, for example, by citing examples to illustrate some of its individual propositions, which has always been denounced by Lenin.

Characterising the dialectical method employed by Marx in his Capital (and what was meant here is precisely the method of ascending from the abstract to the concrete) Lenin wrote: "Such must also be the method of exposition (or

study) of dialectics in general (for with Marx the dialectics of bourgeois society is only a particular case of dialectics)."²⁶

The task set by Lenin in his article "On the Significance of Militant Materialism" as regards the method of exposition and study of dialectics awaits its accomplishment. It is high time for Marxist philosophers to tackle it in earnest.

It is necessary again and again to recall Lenin's testament expressed in it: to elaborate materialist dialectics from every angle and to help scientists creatively to master it because dialectics is the "soul" of the entire Marxist doctrine. Moreover, it is necessary to see all the time the succession which inseparably links this article of 1922 with all the other works of Lenin, particularly Materialism and Empirio-Criticism and Philosophical Notebooks.

²⁶ V.I. Lenin, Collected Works, Vol.38, p.361.

THE MARXIST-LENINIST VIEW OF DIALECTICS
AS THE THEORY OF KNOWLEDGE AND LOGIC

(An extract from the author's posthumously published book, Dialectics as Logic and the Theory of Knowledge. An Essay on Logico-Epistemological Analysis, Nauka Publishers, 1973.)

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Identity of Dialectics, Logic
and the Theory of Knowledge

The idea of the identity of dialectics, logic and the theory of knowledge is central to Lenin's rich philosophical legacy. Lenin wrote: "If Marx did not leave behind him a 'Logic' (with a capital letter L), he did leave the logic of Capital, and this ought to be utilised to the full in this question. In Capital, Marx applied to one science logic, dialectics and the theory of knowledge of materialism (three words are not needed: it is one and the same thing) which has taken everything valuable in Hegel and developed it further."¹ This idea is of fundamental importance for understanding the essence of Marxist philosophy and its relation to the other sciences.

The idea of the identity of dialectics, logic and the theory of knowledge is not specific but universal, being essential for the solution of any problem of Marxist philosophy not of some single problem.

¹ V.I. Lenin, Collected Works, Moscow, Vol.38, p.319.

This idea is universal because it determines the substance and specific features of materialist dialectics in contrast to Naturphilosophie, gross empiricism and the purely speculative-logical method of analysing the phenomena of reality. It goes without saying that only on the basis of this idea is it possible to achieve a fruitful Marxist solution of logical problems.

In substantiating and developing his view of the subject-matter and content of materialist dialectics, Lenin relied above all on the philosophical legacy of Marx and Engels. In his economic works (Economic Manuscripts of 1857-1858. A Contribution to the Critique of Political Economy, and Capital) Marx considers the question of elaborating dialectics as a method of scientific thinking, of all its aspects. Thus, in the section "The Method of Political Economy" of Economic Manuscripts he concentrates on the unity of the abstract and the concrete, the logical and the historical in theoretical scientific thinking. There Marx forcefully emphasised the importance of dialectics as the method for penetrating into the essence of phenomena, the method for analysing reality and reproducing it in the logic of concepts.

Marx made a practical application of this method in his Capital to the cognition of phenomena in economic life in capitalist society.

Lenin held Marx's Capital to be a model of scientific cognition of the most complex phenomena. Lenin held the method used in Capital to study phenomena and to set out the results of cognition to be universal. He wrote: "In his Capital, Marx first analyses the simplest, most ordinary and fundamental, most common and everyday relation of bourgeois (commodity) society, a relation encountered billions of times, viz., the exchange of commodities. In this very simple phenomenon (in this "cell" of bourgeois society) analysis reveals all the contradictions (or the germs of all the contradictions) of modern society. The subsequent

exposition shows us the development (both growth and movement) of these contradictions and of this society in the [summation - Ed.] of its individual parts, from its beginning to its end.

"Such must also be the method of exposition (or study) of dialectics in general (for with Marx the dialectics of bourgeois society is only a particular case of dialectics)."²

In solving the problem before him, Lenin also proceeds from Engels' propositions about materialist dialectics being a science "of the general laws of motion; both of the external world and of human thought",³ and especially his idea that dialectics is not a philosophy standing over and above the other sciences.

Engels regarded the question of a method for the development of scientific knowledge, for the development of science, to be highly important, and considered it in his Anti-Dühring and other works. It was Engels who formulated the Marxist proposition about the essence of dialectical logic, its basic problems, and the relation between dialectics and formal logic.

In elaborating dialectics as logic and the theory of knowledge, Lenin turned to the philosophical legacy of the past and analysed the way the problem was put and solved in the writings of Aristotle, Kant, Hegel and the leading materialists of the past. First of all, Lenin made a thorough study of Hegel's method, notably his Science of Logic, in order to bring out all the rational aspects of the method and to develop them further in the light of new scientific achievements and the requirements of the workers' struggle; he noted Hegel's idea about the identity of dialectics, logic and the theory of knowledge and, especially, its materialist application by Marx in his economic analysis.

² Ibid., pp.360-361.

³ K. Marx, F. Engels, Selected Works, Moscow, Vol.3, p.362.

The idea of the identity of dialectics, logic and the theory of knowledge is not a casual remark, but an idea that is central and fundamental to Lenin's Philosophical Notebooks, an idea to which he repeatedly returned and which he consistently applied in dealing with every problem. The proposition about the identity of dialectics, logic and the theory of knowledge is a natural result of the development of the whole history of philosophy.

Before Aristotle's time, philosophy was not divided into ontology (the theory of being), epistemology (the theory of knowledge) and logic (the science of the laws and forms of thought), because it was not adequately developed. Aristotle's writings give a hint of this division, and in the Hellenic period of Greek philosophy we find the incipient process of the separation of the particular sciences from philosophy, on the one hand, and the division of philosophy into its special parts of ontology, epistemology and logic, on the other. Thus, the Stoics established the subject-matter of formal logic, whereas Aristotle had still seen it as a blend with metaphysics (ontology). A turning point came in the 18th and the first half of the 19th century, when on the one hand, all the basic branches of modern scientific knowledge separated from philosophy and on the other, the separation of the special spheres within philosophy itself reached a point of their isolation from each other, a state especially characteristic of Kant's writings.

This separation of ontology, logic and epistemology from each other by Kant was also of positive significance for the further development of philosophy. First of all, Kant showed metaphysics, or ontology, which in its earlier meaning had reached the point of self-negation, to be untenable and even impossible. Of course, philosophy in the form of Wolffian ontology, as a doctrine of God, the world and the soul, was no longer feasible and appeared to be anachronistic in the latter half of the 18th century. The fact that Kant realised this goes to his credit. He was

aware of the importance and the need of theoretico-cognitive problems for the further development of philosophy.

The development of philosophy as the theory and method of cognition is a historical necessity, for it assures philosophy of invigorating bonds with various fields of science. Natural science and other fields of science have no need of metaphysics (or ontology divorced from the analysis of cognition) treating of supernatural substances and general laws of being, derived outside the context of the generalisation of the advancing process of cognition, nor of natural philosophy speculatively structuring a system of nature, but of a theory of knowledge equipping natural science and the other sciences with a method of scientific cognition, helping scientists to think along the right lines, give rational treatment to facts and elaborate theories.

However, Kant's philosophy, advanced as a theory of knowledge is a far cry from true science. It was his metaphysical method that played the fatal role, for his theory of knowledge is isolated from the study of the laws and forms of being itself, and is locked in the analysis and critique of man's cognitive capabilities. The organic defect in Kant's theory is his reduction of the theory of knowledge to the study of the forms of man's subjective activity alone. Kant's theory of knowledge was not aimed to generalise the results of cognition for the purpose of bringing out the objective content of knowledge and the objective laws underlying the development of phenomena in reality.

From Kant's time on, the development of philosophy advanced along the line of unification of the theory of knowledge, logic and ontology. In the formation of this view of it, Hegel's philosophy marked a definite stage, being an attempt to overcome, on an idealistic basis, the separation of the laws and forms of thought from the laws of the objective world. He was one of the first to realise that it was possible for philosophy to continue its meaningful development only if it recorded the laws of being,

which were simultaneously the laws of the motion of thought. He wrote: "That is why logic coincides with metaphysics, with the science of things comprehended in thoughts."⁴

By overcoming the gap between logic and the theory of being, Hegel discarded the incorrect view of the forms of thought as being purely subjective, and showed their objective content. Hegel's achievements in formulating the principle of the identity of the laws of being and the laws of thought were duly appreciated by the founders of Marxism-Leninism. Lenin wrote: "Hegel actually proved that logical forms and laws are not an empty shell, but a reflection of the objective world. More correctly, he did not prove, but made a brilliant guess."⁵

But Hegel started from an idealistic view of the identity of thought and being, which is why his view of the relation between the laws and forms of thought and the laws of objective reality itself is idealistically twisted and oversimplified. For Hegel, the laws of thought were simultaneously the laws of objective reality, because everything was based on thought, and because the whole process of development was nothing but self-cognition, that is, the cognition by thought of itself.

Thus, instead of a real solution of the complex problem of the relation between the laws of thought and the laws of being, Hegel simply eliminated the problem by insisting that thought was reality, being, itself. "It would be wrong," he wrote, "to assume that things first constitute the content of our notions with our subjective activity joining in later and constituting their concepts by means of... the operation of abstraction and conjunction of what is common to things. On the contrary, the concept is the truly initial, and things are what they are thanks to

⁴ Hegel, Works, Vol. 1, Moscow-Leningrad, 1930, p. 52 (in Russian).

⁵ V.I. Lenin, Collected Works, Vol. 38, p. 180.

the activity of the concept which is inherent in them and is revealed in them."⁶

The concept being the true reality, Hegel's logic embraces everything, the whole of philosophy being transformed into logic.

Consequently, whereas before Hegel's time ontology sought motionless and everlasting substances, abstracting itself from the process of cognition, epistemology studied the cognitive capabilities of the human spirit regardless of the objective regularities, while logic described the subjective forms of thought, abstracting itself from their content. Hegel put the three spheres together on the basis of his idealistic view of the identity of thought and being, dissolving ontology (or metaphysics) and epistemology in logic. He considered the laws of the objective world (nature) as being the same laws of logic, only in the realm of nature, thought's other being. Marx wrote: "For Hegel, all that has happened and is still happening is only just what is happening in his own mind."⁷

The problem of the relation between the laws of thought and the laws of the objective world can be solved correctly through recognition of the principle of reflection, a presentation of the dialectics of the relation between thought and being, an understanding of the role of practice in the theory of knowledge, rather, of the fact that practical sensory activity is the immediate basis on which all the spiritual capabilities, including thought, arise.

Marxist philosophy overcame the gap between ontology and epistemology on the dialectico-materialist basis of the theory of reflection and understanding of the dialectic of subject and object in the process of man's practical activity in creating a new world of things and relations. In the past, philosophers either separated subject and object to the point of isolating them from each other, or joined

⁶ Hegel, Works, Vol.1, p.270 (in Russian).

⁷ Karl Marx, The Poverty of Philosophy, Moscow, 1966, p.95.

them together as being coexistent, allowing the existence both of the subjective and the objective, of human thought and reality external to it, with philosophy studying the one and the other.

Materialist dialectics does not stop at demarcating man from objective reality, subject from object. Of course, no philosophy is possible unless the two are separated, because the very formulation of the basic question concerning the relation between human consciousness and the environment implies a demarcation between man and objective reality, which is external to him. But if philosophy stops at the division of everything that exists into subject and object and postulates their existence with their own specific laws of motion, it will never go beyond the point of agnosticism, as Kant's example shows. Lenin remarked on the defects of Kantianism when he said: "In Kant, cognition demarcates (divides) nature and man; actually it unites them."⁸

Marxism connects subject and object on the real basis on which they are linked in history; subjective dialectics is the same objective motion but only in a different form of its being than it is in nature. Here, subjective dialectics is understood to mean not only the motion of thought but also man's historical activity as a whole, including the process of thought. The subject is not reducible to consciousness alone; consequently, its dialectics, too, is not confined to the activity of human thought.

The fullest coincidence of subject and object occurs in men's historical practice, for human activity takes place in accordance with objective laws. The relation between the laws and forms of thought and the objective reality external to it is an aspect of the common dialectics of subject and object.

⁸ V.I. Lenin, Collected Works, Vol.38, p.91.

The development of our thought is only a reflection of objective dialectics, and the laws of thought are a reflection of the laws of nature.

The French materialists also regarded cognition as reflection, but they were unable to give a scientific answer to the question of the relation between the laws of thought and the laws of nature. Taken by itself, the principle of reflection guarantees only an abstract materialist solution to the problem: nature is primary, and thought, a reflection of nature, is secondary, derivative. But this is not enough for a profound and comprehensive answer. Thus, for instance, if reflection itself is considered metaphysically, as the old materialism did, important aspects of thought, such as its activity, its creative character, the process of its motion and development, the specifics of cognition itself, the complexity of its relation with the objective world, will remain outside our field of vision; materialism itself will be inadequate and incapable of totally overcoming idealism, in which these aspects are brought to the fore and turned into absolutes. That is why the principles of dialectics had to be applied to the concept of reflection itself: dialectics had to be extended to the sphere of cognition. Lenin wrote: "In the theory of knowledge, as in every other sphere of science, we must think dialectically, that is, we must not regard our knowledge as ready-made and unalterable, but must determine how knowledge emerges from ignorance, how incomplete, inexact knowledge becomes more complete and more exact."⁹

The reflection of nature in man's mind is not static, is not a lifeless copy of reality, but a growing penetration into the substance of things.

An understanding of the dialectics of reflection makes it possible to gain a deeper insight into the unity of the laws of thought and the laws of being.

⁹ V.I. Lenin, Collected Works, Vol. 14, p. 103.

The coincidence of the laws of thought and the laws of being does not mean that there is no distinction between the two. They are one in content, but differ in the form of their existence. Lenin wrote: "The laws of logic are the reflections of the objective in the subjective consciousness of man."¹⁰

A clarification of the role of practice in the reflection of reality is essential if the relation between the laws of thought and the laws of being is to be understood. Pre-Marxian philosophy was unable to answer the question it had itself posed: how and on what basis is thought connected with nature? It merely assumed nature to be on the one side and thought on the other. Marxism proved that practice, the change of nature by man, is the most essential and immediate basis for human thought. Indeed, the inclusion of practice into the theory of knowledge is the greatest achievement of philosophical thought. The objective nature of the content of our thought, the coincidence of the laws of thought and the laws of being is achieved and verified by man's practical influence on nature.

The coincidence, in terms of content, of the laws of thought and the laws of being provides the basis for the identity of dialectics, logic and the theory of knowledge. Engels wrote: "We comprehended the concepts in our heads once more materialistically--as images (Abbilder) of real things instead of regarding the real things as images of this or that stage of the absolute concept. Thus dialectics reduced itself to the science of the general laws of motion, both of the external world and of human thought--two sets of laws which are identical in substance, but differ in their expression in so far as the human mind can apply them consciously, while in nature and also up to now for the most part in human history, these laws assert themselves unconsciously, in the form of external necessity, in the midst of an endless series of seeming accidents. Thereby

¹⁰ V.I. Lenin, Collected Works, Vol.38, p.183.

the dialectic of concepts itself became merely the conscious reflex of the dialectical motion of the real world."¹¹

This idea of Engels's was further substantiated and elaborated by Lenin, who said that dialectics is simultaneously the theory of knowledge and the logic of Marxism. In his work Karl Marx, Lenin formulated the following proposition: "Dialectics, as understood by Marx, and also in conformity with Hegel, includes what is now called the theory of knowledge, or epistemology, which, too, must regard its subject-matter historically, studying and generalising the origin and development of knowledge, the transition from non-knowledge to knowledge."¹²

Once the laws of the objective world have been established, they also become the laws of thought, and all the laws of thought are reflected laws of the objective world; in discovering the laws governing the development of the thing itself, we also comprehend the laws governing the development of cognition, and vice versa, the laws of the objective world are discovered through a study of cognition and its laws. Precisely because dialectics reveals the laws governing the motion of things and processes it also becomes a method, a logic of the advance of thought towards the discovery of the objective nature of the thing, directing the process of thought in accordance with objective laws so that in its content thought coincides with the objective reality external to it and leads, once it is implemented in practice, to a new world of things and relations. That is why, when reading Hegel, Lenin emphasised the following idea: "Logic is the science not of external forms of thought, but of the laws of development 'of all material, natural and spiritual things', i.e., of the development of the entire concrete content of the world and of its cognition i.e., the sum-total, the conclusion of the History of knowledge of the world."¹³

¹¹ K. Marx and F. Engels, Selected Works, Vol.3, p.362.

¹² V.I. Lenin, Collected Works, Vol.21, p.54.

¹³ Ibid., Vol.38, pp.92-93.

In a sense, Lenin regarded not only philosophy but every other science as logic. He wrote: "Every science is applied logic."¹⁴ That is not to say, of course, that every science has thought and its laws and forms as the object of its analysis. Science is logic only to the extent to which it comprehends the laws governing the motion of things and processes in the forms of thought, creating a definite method for comprehending its object; special methods of cognition of definite objects are created on the basis of scientific theories, and thus any science is applied in terms of the specific subject of logic.

Materialist dialectics, as logic, differs from any other science in that on the basis of cognition of the laws governing the development of any thing in general, it creates a universal method for the advance of thought towards the truth, formulating logical problems arising before every science (science in general) as it cognises the truth, whereas any other science expresses in concrete terms and applies this logic to the cognition of its special subject-matter.

Thus, Lenin did not reduce materialist dialectics to logic only as a theory of the laws and forms of thought. On the contrary, continuing in the way of Hegel and Marx, he enlarged the very concept of logic to a point where the whole content of Marxist philosophy--the outlook and method of theoretical scientific thinking--stands in relation to all the other sciences as method and logic governing the advance of cognition towards the objective truth. It is, however, as such only to the extent to which it discovers the laws and forms governing the development of any object, of any subject-matter in general.

The identity of dialectics, logic and the theory of knowledge, based on the coincidence, in terms of content, of the laws of being and thought, should not be seen as a

¹⁴ Ibid., p.201.

static state. Such a state is, in fact, alien to dialectics. Like any other real and not abstract-logical process, this identity is also a process.

This process of the coincidence of dialectics, logic and the theory of knowledge, as we have said, is, above all, the result of the historical development of philosophy, a process which is not yet complete, for their separation has yet to be finally overcome. The scientific principles of their identity have been established, but if it is to become ever more complete there is need further to elaborate all the problems of philosophy on the basis of these principles. That is why Marxism marked the start of a new period in the development of philosophy, when the identity of dialectics, logic and the theory of knowledge becomes truly ever more complete in every respect. Furthermore, there is also need to deal with their identity as a process from another angle as well. Once the laws of objective reality have been cognised, they are consciously used in the process of thought. Consequently, there is a time interval between their cognition and their conversion into the laws governing the functioning of human cognition. Thought is not governed by any other laws except those which exist in objective reality, but the subject needs to comprehend the latter in terms of converting them into the laws and forms of his own thought. That is precisely the process connected with the conversion of objective truth into the rules of thought.

Is It Right to Single Out the Separate Parts
of Marxist Dialectics: Ontology, Epistemology,
Logic and Philosophical Anthropology?

Materialist dialectics has put an end to the old and predominantly idealistic ontology, epistemology (which leads to agnosticism) and logic, which served as the basis of the metaphysical method of thinking. But does it not itself consist of the separate parts of dialectico-materia-

list ontology, epistemology and logic? Indeed, to this very day some philosophers insist on the need to set up Marxist philosophical anthropology as an independent scientific discipline.

Considering that the problem has been raised in philosophical writings, let us look at it in greater detail.

Ontology as the philosophical theory of the universal principles and forms of being is also called metaphysics by bourgeois writers. Marxist writers understand metaphysics to mean a definite method of cognition used in the science of the 17th and 18th centuries, its specific method being the absolutisation of individual aspects of the objective world. It yielded definite positive results in a period when science was mainly engaged in collecting, describing and classifying the facts, before it got down to a profound analysis and interpretation of complex processes in nature and social life. This meaning of the term "metaphysics" originated with Hegel.

However, it became clear in the mid-19th century that the metaphysical method tended to put fetters on the development of science and that its results could be explained only on the basis of a more profound philosophical theory, namely, materialist dialectics.

The attitude of dialectical materialism to metaphysics as a method of cognition has been quite fully and circumstantially brought out in philosophical writings. Dialectics overcomes the limitations of the metaphysical method even as it retains, in a modified form, some of its positive elements. The advance of philosophy from the metaphysical to the dialectical method fits in within the general framework of the development of scientific knowledge from a theory with a fairly limited sphere of application to a much more comprehensive theory, in which the former appears as no more than a particular and marginal instance.

But the term "metaphysics" also has another, more ancient meaning, in which it is used in philosophical,

chiefly non-Marxist, writings even today. Metaphysics is used to designate that part of philosophy which deals with the formulation of the general principles and concepts applied to being in general. The various trends in modern philosophy differ in their view of the subject-matter of metaphysics but they are in consensus on the assertion that metaphysics is the theory of being, or what exists in general, meaning everything that exists in one form or another. We find this kind of metaphysics in present-day philosophical trends like neo-Thomism, which has two metaphysics: general (a code of principles applied to all things that exist—including both God and the created world) and particular, or applied (dealing only with the created world); and trends like existentialism which holds metaphysics, or fundamental ontology, to mean the clarification of the meaning and substance of being, with the substance of human being regarded as basic, for, the existentialists claim, the world and reality can be comprehended only after the meaning of man and his being are established. However, the existentialists take an incorrect view of the problem.

Positivism, notably logical positivism, for its part, has directed its barbs against this metaphysics. However, dialectical materialism and positivism take a diametrically opposite approach to the critical overcoming of metaphysics. Positivism simply rejects this metaphysics, declaring all its problems connected with the theory of being to be pseudo-problems. What is more, it gives up these problems to religion, thereby recognising its right to exist. That is why positivism has been unable to overcome metaphysics, but has, in effect, paved the way for its existence.

Now and again we find this dilemma being presented: either metaphysics, which claims to provide a universal explanation of the world and which draws for its knowledge on sources other than the various fields of modern science, or positivism in its diverse forms, which rejects the question

of being and its universal laws. Some may feel that there is no way out of this dilemma.

However, materialist dialectics is the philosophy which equally rejects the scholasticism of speculative metaphysics and positivism. There is good reason why since the period of Machism, the positivists have persisted in criticising dialectical materialism for its alleged "dogmatism", and "metaphysics", for its "recognition" of the existence of "things in themselves", independently of consciousness, for its urge to show in its concepts and categories the most general laws governing the motion of the objective world. Meanwhile, the advocates of metaphysics, for instance, the neo-Thomists, have accused the founders of dialectical materialism, Engels in particular, of taking a "positivist" approach to the understanding of the subject-matter and problems of philosophy. Here, they have referred to what Engels said about science no longer being in need of a philosophy as such.

This question arises: what then is dialectics: is it a theory of the universal laws of being (designated as metaphysics) or a universal scientific method of thought applicable in every field of scientific knowledge (on which positivism insists)? Presented in this light, dialectics is perhaps neither the one nor the other.

Actually, the specific feature of dialectical materialism consists precisely in the fact that, resting on the idea of the identity of dialectics, logic and the theory of knowledge, it takes a totally different approach (than do metaphysics and positivism) to the subject-matter of philosophy, and does not separate the method of thought from the laws of motion of phenomena in the objective world. The task of philosophy has always been and will always continue to be a study of the phenomena of objective reality and the laws of their motion. Here, dialectical materialism is no exception, for it continues the tradition inaugurated by the ancient philosophers. In what sense does it then differ

from metaphysics as an earlier philosophy, or from present-day non-Marxist philosophy? What are the specific features of its approach to the study of reality?

First of all, dialectical materialism does not conceive the comprehension of the laws of objective reality without a generalisation of the results produced by the various branches of science. It is now clear to everyone that the philosophy which obtains its knowledge of the universal principles of being outside the data provided by the sciences of nature and society has come to an end. The metaphysical constructions of neo-Thomism and existentialism are defective because--apart from various other reasons--they are divorced from the results of scientific knowledge and insist on metaphysics which, in effect, shuns the sciences. What is more, Heidegger's "fundamental ontology", for instance, is aimed directly against the scientific view of reality and contrasts philosophy and the concrete sciences.

At present, some philosophers have urged the establishment of a scientific, Marxist ontology in two versions: 1) a theory of being in general, and 2) a theory of human being in society (the ontology of social being).

The first-version ontology implies the possibility of bringing out the most general forms, properties and relations of things which cannot be comprehended by any particular science of nature or society. The second-version ontology poses the same problem with respect to human activity, notably practice, a theory of which produces a materialistic-historical ontology starting from the simplest forms of being and going on to the most complex, including the objectivisation of human culture.

So far these efforts have not been successful. We think they will not succeed in the future either, for the idea of constructing a Marxist ontology as an independent science, or any separate part of it, is doomed to fail because it clashes with one of the fundamental principles

underlying Marxist-Leninist philosophy, namely, the identity of dialectics, logic and the theory of knowledge. Even if these modifications of ontology or metaphysics should be based on a generalisation of the data produced by the natural or social sciences, they will not become a truly philosophical theory of being (nature or society) because ontology, whatever its version, presents being or the existent in general as such as the object of analysis, that is, it implies the formulation of a "universal theory of being". Let us recall that in criticising the Machist S. Suvorov, Lenin clearly expressed his attitude to the effort to construct similar theories, when he wrote: "Well, well, here we have 'the general theory of being' discovered anew by S. Suvorov, after it has already been discovered many times and in the most varied forms by numerous representatives of scholastic philosophy. We congratulate the Russian Machists on this new 'general theory of being'! Let us hope that their next collective work will be entirely devoted to the substantiation and development of this great discovery!"¹⁵

Let us bear in mind that positivism does not pose the question of being in general and also of its relation to thought. For its part, dialectical materialism holds that consideration of being in general, of the existent as such, is irrelevant, and that philosophy starts at the point where the question of relation between being and thought is posed.

The first definition of being, which has any concrete content and goes beyond the mere tautology that being is what exists, includes within itself a contrast between being and thought; being exists outside and independently of whether we conceive it in thought or not. The attempts by philosophers to produce a theory of being without considering the question of its relation to thought or to eliminate the question of being altogether have never yielded any results of positive importance for the develop-

¹⁵ V.I. Lenin, Collected Works, Vol.14, p.334.

ment of science and the activity in transforming reality. Of course, individual branches of science may well consider the question of the concrete forms and types of being (things, processes), without specially raising the question of their relation to cognition, because that is not part of the subject-matter of the science or because it accepts the philosophical answer not only for the given concrete forms of being (atom, cell, etc.) but also for being in all its diverse forms.

The history of philosophy tells us that individual philosophical schools and thinkers of the past tackled many problems of being without clearly considering the question of its relation to thought. Philosophy originated as a theory of proto-existence, but that was at a time when it was the only form of scientific knowledge of the world. A great deal has changed since then. From the science called philosophy special fields of science have sprung; a part of its content mainly consisting of metaphysical and speculative reflections of being in general, not borne out by the development of science, lost their importance and moved outside the field of scientific vision, while another part was reconsidered and further developed, constituting the basis of the scientific philosophical theory of being. This process of reconsideration included an analysis of being and all the categories expressing it via the fundamental question of philosophy, that of the relation between thought and being.

All the categories of dialectical materialism, beginning with matter, contain the answer to the question of the relation between thought and being. The concept of matter is the first concrete definition of being.

Some philosophers, even among those who accept dialectical materialism, think that it is possible to give a definition of matter outside the context of the question of its relation to consciousness, that is, a definition of matter as such, as some substance. Indeed, matter is ob-

jective reality existing by itself, independently of consciousness, and that is its first and essential definition, without which it is impossible to make any further advance in the theory of matter.

But the concept of matter in dialectical materialism is not identical with substance in the sense with which it is invested by various metaphysical systems. Matter is not a metaphysical substance lying at the basis of all things, it is all phenomena, things and processes existing outside and independently of human consciousness. The concept of matter is meaningless outside the context of the relation between being and thought.

Marxist philosophy does not consider the question of social being in general, irrespective of its relation to social consciousness, but advances the question of the relation between being and consciousness, whereupon everything is clarified, being and consciousness are contrasted, and, consequently, the philosophical concept of being becomes definite.

Since Marxist philosophy can have no concept of being outside the context of its relation to consciousness, there can be no separate science of being in general (ontology) which does not simultaneously consider epistemological problems. But then, in this sense it is not epistemology either, because it does not consider the forms and laws of cognition outside their relations to the forms and laws of being. The thought-being relation is the starting point for all the philosophical categories of dialectical materialism, which simultaneously performs the functions of ontology and epistemology, but not in such a way that appears to suggest the existence of separate systems of ontological and epistemological categories. On the contrary, all the categories of dialectical materialism are simultaneously ontological (in the sense that they have content taken from the objective world, from being) and epistemological (because they provide the answer to the question of the relation between

thought and being and themselves serve as a step in the advance of cognition).

Dialectical materialism does not confine itself to the abstract demarcation of the laws of being and the laws of thought; it reasons to a point of bringing them together in identity, in coincidence, which also includes some distinction. For philosophy, let us note, it is the identity of these laws that is of fundamental importance.

Starting from the identity of the laws of thought and the laws of being, dialectical materialism overcomes agnosticism. Thought attains to objective truth and coincides in content with the object external to it because its own motion is governed by the laws of the object.

Whenever the critics of Marxist-Leninist philosophy draw attention to the fact that dialectical materialism is a science of the universal laws and forms of being, they regard it as being no more than a special type of metaphysics, or ontology, and when they realise that materialist dialectics is a theory of thought and of its universal laws and forms, they insist that it is no more than a logic which is in some way akin to present-day positivism. They appear to suggest that dialectical materialism contains within itself two different philosophies: metaphysics and logic. Actually, however, it is not to be reduced either to the one or to the other separately, or to their aggregate. What is usually regarded as metaphysics turns out to be logic, while the latter becomes a theory not only of thought but also of the forms of being itself, which are reflected in the laws and categories of thought. Man is interested in the objective world and its laws not as an end in itself, but as a means to satisfy definite social requirements. Here we arrive at the next specific feature of dialectical materialism.

Being exists objectively. But how is it considered: as the subject of contemplation or the object of man's material, sensory practical activity? Metaphysics, or ontology, as a

rule, excludes man's practical activity from its consideration of being, seeking to comprehend the latter in a pure form. Dialectical materialism, for its part, regards being and its forms in the light of the requirements of man's transforming activity.

Some Western philosophers insist that dialectical materialism is incompatible with Marx's conception of man, and accordingly, on the pretext of developing the latter, abandon "dialectical materialism" not only as a term but also the whole of its content.

However, neither Engels nor Lenin ever held the sole task of philosophy to be a study of object and man as such, but also accepted and elaborated Marx's thesis of the need to change the world and man himself.

There is no ground at all for the charges that dialectical materialism allegedly ignores man and human practice, which is why it needs to be replaced by some "humanistic philosophy". Dialectical materialism has no ontology that would consider being only as such, outside the context of human practice. Anyone starting out to construct this kind of ontology inevitably equates it with Wolffian metaphysics.

Dialectical materialism seeks to cognise being not only as that which exists, but also as that which is due to be, in the form it is to acquire as a result of man's practical activity. What exists is comprehended through what is due to exist, but the latter is itself based on the knowledge of objective reality and the laws governing its motion.

Dialectical materialism does not rule out human purpose from consideration of being, but then neither does it divorce it from the objective regularities of the development of being itself. In his practical activity, man proceeds from the objective world, which is its object. In implementing its plans, human practice must start precisely from the objective world, because it simply has nothing else to start from.

The problem of man is undoubtedly among the most important ones in Marxist philosophy, but how is it to be considered and tackled? Some believe that Marxism needs to have a special science—philosophical anthropology—which would allegedly solve the problem. It is assumed that this "Marxist anthropology" would borrow its recipes from the same anthropology which still "flourishes" in bourgeois philosophy.

Marx and Engels had before them the philosophical anthropology of Ludwig Feuerbach, and succeeded in overcoming its defects. The problem of man in Feuerbach's philosophy was presented in an extremely abstract form, and Marx and Engels cited the example of Hegel who had no special philosophical anthropology but who presented the problem of man much more fully and deeply than Feuerbach did. Engels said this about Feuerbach: "He appears just as shallow, in comparison with Hegel, in his treatment of the antithesis of good and evil."¹⁶

It is not right to consider man in abstract terms, in isolation from his actual historical development. It is not right to contrast man and universal laws, because they are considered to the extent to which they appear in human practice, notably in the diverse forms of scientific knowledge, for their knowledge is just as necessary for understanding man and the principles of his practical and theoretical activity. Consequently, the philosophical anthropology proposed by some scientists as an "independent" part of Marxist philosophy differs little from the second-version ontology (the ontology of social being) and shares all its defects.

Indeed, the weak point of many so-called humanistic theories consists precisely in the fact that in their reflections about humanising society they tend to separate themselves from reality to such an extent that their constructions for ever remain no more than metaphysical dreams.

¹⁶ K. Marx and F. Engels, Selected Works, Vol.3, p.357.

The concepts and categories of dialectical materialism reflect objective reality in the light of the purposes of man's practical activity at a given stage of his development. These purposes, if they are based on cognised objective regularities, are no hindrance to the cognition of being and its forms such as they actually exist and serve as prerequisites for this cognition. Human purposes are, after all, the purposes of society and not of lone individuals and are determined by a knowledge of the laws of social development. That is why the subject-matter of Marxist philosophy includes the study of the laws of social development. This question may well arise: why should philosophy, whose subject-matter is the universal laws and forms of being, consider the particular, the forms and laws of social development? After all, that is the subject-matter of sociology. Indeed, that is the approach we find in some philosophical systems: the study of the laws and forms of being is isolated from the study of the laws of social being.

Man's historical being in the world is considered by historical materialism, which constitutes a single whole with materialist dialectics. No problem of dialectical materialism, beginning from the basic question of philosophy and ending with the theory of truth, can be solved without the materialist view of history. An understanding of the laws of social development is necessary to substantiate the proposition of consciousness as a property of matter and a product of social development, of practice as the basis and criterion of truth, etc. Without a knowledge of the laws of social development no dialectical conception of development can be produced. Some have said that the laws of dialectics, specifically the unity and conflict of opposites, are anthropomorphic, being allegedly taken from human society and transferred to the development of living and non-living natural phenomena.

That is not true. Dialectical materialism does not transfer the laws of nature to society and, vice versa.

Thus, neither the law of the conservation of energy, which operates in nature, nor the law of the succession of socio-economic formations, which operates in society, are converted by dialectical materialism into universal principles of all being, although these laws are important for substantiating the dialectico-materialist view of the world.

On the strength of its generalisation of the whole experience in cognition and practice, dialectical materialism discovers the universal laws of development, but the knowledge of the laws of social development acquires especial importance in this context, because society is the highest and most mature form of development, and the knowledge of the higher forms is the starting point for the knowledge of the lower ones.

If consideration of the highest form--society--is necessary for an understanding of the laws of development, the latter should also be taken in their most mature form: modern society in its main tendencies of development. This, according to Marxism, is communism, a point that needs constantly to be borne in mind, because today even among many of those who appear to be sincere in their efforts to elaborate Marxist philosophy some have insisted on the idea that nature should be considered in the light of man's requirements and his practice, without specifying which man and which practice, and dealing with man and practice in general. This is one way of losing sight of the specifics of Marxist philosophy.

Thus, materialist dialectics reflects the laws of motion of things and of processes in the objective world, including man and his society, laws which appear as the principles and forms of men's subjective activity, including the activity of thought. In this sense, Marxist dialectics performs, on a new philosophical basis, the functions of ontology, epistemology, logic, and philosophical anthropology, without being reducible to any of them, whether jointly or severally.

HOW PHILOSOPHICAL CATEGORIES DEVELOP

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It is quite natural to ask how the allround development of sciences, the scientific and technological revolution and present-day socio-historical practice are to be expressed in the categories and concepts of dialectical materialism, because Marxist-Leninist philosophy assimilates in a specific form and reworks the whole historical experience of mankind. It goes without question that this philosophy can perform its functions only by relying on the latest experience, organically tying it in and blending it with the entire past experience and, consequently, duly developing and improving its whole system of categories.

This question is undoubtedly of essential importance for dialectical materialism and its relationships with the special sciences.. This largely involves the specifics of philosophy and its place and role within the complex system of scientific knowledge and men's practical transformative activity. A correct solution of the problem is bound to make a contribution to realising Lenin's idea about the need constantly to enrich and develop Marxist philosophy to allow it effectively to perform its functions at every new stage of history.

1.

Philosophical categories are known to fulfil a special role in human cognition and in the mastering of the laws of

nature and society. Any cognition, and not only philosophical cognition, formulates concepts and categories expressive of the inner and essential aspects and relations of the objects being analysed. Concepts, laws and principles are the basic nodal points of any scientific system. In contrast to concepts in the special sciences, philosophical categories are universal, and it is this that enables them to perform the methodological functions in any process of cognition.

By generalising the universal, essential, regular links in nature and society and the laws of their development, philosophical categories also operate as categories of thought and cognition. Therein lies their crucial uniqueness as compared with the categories and concepts of the special sciences, a fact which invests philosophical categories with a universal methodological importance as the nodal points of any cognition. In other words, these categories, reflecting universal links and regularities in the objective world are simultaneously logical categories. Without them thought is impossible. Consciously or unconsciously, everyone thinks with the aid of categories like cause and effect, necessity and chance, general and particular, etc. Engels stressed that for thought there is need for "thought determinations", but these should be taken from scientific philosophy instead of being subservient to "the worst vulgarised relics of the worst philosophies".¹

Marxism rejects the division of categories into "ontological" (that is, categories of being) and "epistemological," "logical" (that is, categories of thought cognition). Every category of dialectical materialism is a unity of the ontological and the epistemological aspects. Lenin repeatedly stressed that materialist dialectics, the science of the laws of development of the objective world, is simultaneously logic and the theory of knowledge.

¹ F. Engels, Dialectics of Nature, Moscow, 1954, p.279.

The content of materialist dialectics is not confined to the theory of the universal laws of the objective world. In general, we can know nothing of objective dialectics unless it is reflected, reproduced in man's mind, in his concepts and notions. What is more, and the history of philosophy shows this, the experience of struggle against metaphysical concepts, the study and development of the dialectical forms of thought and cognition is a necessary condition for the recognition and confirmation of the fact that objective dialectics exists. Let us bear in mind, for instance, that the denial of the dialectically contradictory character of the movement of thought and concepts is extrapolated by bourgeois philosophers to natural objects, which are in consequence "purged" of their objectively inherent contradictions. This approach is understandable, because one cannot recognise objective dialectics while rejecting the dialectical character of thought which reflects it, and it is equally impossible to recognise subjective dialectics without recognising the dialectical character of the objective world, the source and basis of the dialectical forms of thought. For this reason, materialist dialectics has always been elaborated as the theory of the indissoluble unity of objective and subjective dialectics.

The principle of the unity of dialectics, logic and the theory of knowledge, and the consequent recognition of the fact that it is not right to divide categories into purely "ontological" and purely "logical", "epistemological", result in the only correct notion about the ways of development and improvement of materialist dialectics and its system of categories in connection with the general development of human cognition and historical practice as a whole.

2.

Philosophical categories are formed as the products of historical development, as generalisations of historically conditioned experience. Engels in general defined philosophical science as "the science of the historical development of

human thought".² Of course, logic operates with the most general categories but nothing in it can be understood outside the context of historical development. Engels wrote: "The theory of the laws of thought is by no means an 'eternal truth' established once and for all as philistine reasoning imagines to be the case with the word 'logic'".³

That is why Engels insisted on taking a most serious attitude to the study of the history of social practice and thought. Indeed, it is in the process of this historical development that categories as the nodal points of cognition were shaped. As he wrote in the preface to his Anti-Dühring, the results summing up the data of experience are concepts, and the art of operating with them is not an innate one, but calls for real thought, which "similarly has a long empirical history, not more and not less than empirical natural science".⁴

The founders of Marxism-Leninism, quite naturally regarding the theory of categories as the science of the historical development of thought, resolutely opposed any metaphysical attempts (which Hegel also made) to construct a closed and complete system of philosophical categories. From the standpoint of Marxism-Leninism, any scientific system of philosophical categories can be (as in any other science) only a developing system, enriching itself with new data and new practice.

Creatively developing the ideas of Marx and Engels, Lenin gave a remarkably clear and precise formula indicating the only true approach to the question of the development of categories and logic as a whole, stressing that the science of logic is "the sum-total, the conclusion of the History of knowledge of the world".⁵ He stressed that "actual histo-

² F. Engels, Anti-Dühring, Moscow, 1969, p.392.

³ Ibid.

⁴ Ibid., p.20.

⁵ V.I. Lenin, Collected Works, Moscow, Vol.38, p.93.

ry is the basis, the foundation, the being which is followed by consciousness."⁶ Lenin set before Marxists the task of further developing the science of logic and repeatedly stressed that this should be done on the basis of generalising the whole history of cognition. "The history of thought from the standpoint of the development and application of the general concepts and categories of logic--voilà ce qu'il faut!"⁷

Because the history of cognition, the history of human practice does not cease, the development and enrichment of the categories of dialectical materialism naturally means their assimilation and reworking of new and developing experience. But further development can occur only on the basis of the categories elaborated in the course of the whole of human history. This needs to be specially stressed because in the recent period the view has been expressed that any system of categories is allegedly no more than a child of its age. It has sometimes even been said that because the system of categories of materialist dialectics took shape "long ago", in the mid-19th century, there can allegedly be no positive answer to the question of whether it is up to the modern scientific level.

There is no doubt that the development of science and practice requires new philosophical generalisations and, consequently, new categories. But it is not right to regard philosophical categories and their systems, which have gone down into the treasure-house of philosophy, as shoes that are worn out and discarded. Of course, Aristotle's logic with its 10 categories is outdated in the light of modern knowledge. But Lenin justly called it "an inquiry, a searching, an approach to the logic of Hegel".⁸ Hegel's own logic can be equally regarded as an inquiry, a searching, an approach to the logic of Marx and Engels. Marxism is known to

⁶ Ibid., p.265.

⁷ Ibid., p.177.

⁸ V.I. Lenin, Collected Works, Vol.38, p.368.

have taken all the valuable elements of Hegel's logic, critically rethinking it and producing the scientific form of dialectical logic.

If Hegel's logic reflected no more than the specifics of the 18th century, why then did Lenin say that it was a summing-up of the history of thought, and in his article "On the Significance of Militant Materialism" recommended that it should be studied in every way and interpreted materialistically?

The whole point is that the development of logic and its categories is not a sum-total of varying views, theories and systems, but a fully law-governed historical process in which what has been acquired is not lost but is retained and "sublated" on a new and higher basis, concentrating experience that is ever richer and more diverse. In this sense, the system of philosophical categories developed over the centuries and critically reworked and enriched by the philosophy of dialectical materialism, which has given it a consistently scientific content and form, constitutes the greatest achievement of human thought, a precious concentration of mankind's historical experience.

Here we come up against yet another specific feature of philosophical categories, which should be taken into account if the nature of their development is to be correctly understood. Once they are extremely general forms of the spiritual and objective-practical assimilation of the world and reflect the most substantial properties of reality in the complex network of its phenomena and processes, they cannot change relatively as rapidly as the concepts of the special sciences.

Every field of knowledge bends its efforts towards discovering the substance and the law of external phenomena in their constant change and flux, that is, that which remains relatively "tranquil", stable and invariant. However, major changes in the development of the special sciences always entail a break-up of the established concepts and a

substitution of new concepts for the old, together with a thorough review of the whole system of concepts. This is best seen in modern natural science.

Philosophical and logical categories are also subject to the general law of change, but it would perhaps be right to express the specifics of their development by saying that they are the "invariant in the invariant", that is, the most stable in the development of the concepts, laws and principles which takes place in the special sciences. Whatever the break-up and restructuring among the latter, they cannot but rest on such fundamental categories as matter, motion, space, time, content, form, and others. No changes in scientific conceptions of reality can lead to a depreciation of these and other categories of Marxist-Leninist philosophy. That is not to say, however, that philosophical categories do not develop at all, something that we shall consider later.

Another important point should be added to what has been said about the general approach to the way categories develop. Marx, Engels and Lenin, formulating the dialectico-materialist theory of categories, relied on the whole experience of human cognition, that is, not only on experience in natural science but also in social cognition. This aspect is very inadequately considered in studies devoted to the development of categories. Many such studies cite mainly data from natural science.

Of course, the continuing revolution in natural science is of tremendous importance for developing and concretising all the aspects of dialectical materialism and provides a great stimulus for this, by setting ever new tasks before it. We have the highly eloquent example of Engels and Lenin, who attached much importance to the connection and interaction between Marxist philosophy and natural science, and who did so much to enrich dialectical materialism and its categories by summing up the new data of the science of nature.

In a 1914 article entitled "Socialism Demolished Again", Lenin blasted Struve's attempts to discredit the idea of law, the conformity to law in society and social science and spoke of the "powerful current" flowing from natural to social science, not only in Petty's time, but in Marx's time as well. "And this current remains just as powerful, if not more so, in the twentieth century, too."⁹

But Lenin also emphasised another aspect, the importance of the flow running from social to natural science, and which is undoubtedly of equal importance for the development of philosophy and philosophical categories. Lenin showed that advances in natural science reinforced and made inevitable the idea of natural law in the science of society, notably political economy, and pointed to the fact that it was Marxism that had "conclusively substantiated this idea, after stripping it of its metaphysical (in the Marxist sense of this term, i.e., anti-dialectical) absurdities and defects."¹⁰

This idea of Lenin's is of the utmost importance for understanding the way in which the categories of dialectical materialism have been elaborated.

Marxism did not merely accept the progressive ideas of natural science, like the idea of regularity, causality, and others, but developed them and enriched their content by drawing on the matter of social life, thereby exerting a powerful influence on the development of the whole of human cognition. In this context, there is need to recall another remark of Lenin's in his Philosophical Notebooks, where he showed that the general theory of dialectical development and change had been "divined" before its application in nature and society (meaning Hegel's The Science of Logic) and added that it had been applied to society earlier (1847, the year when the Communist Manifesto was written) than to

⁹ V.I. Lenin, Collected Works, Vol.20, p.196.

¹⁰ Ibid., p.197.

natural science (Lenin mentioned 1859, that is, the year of the publication of Darwin's Origin of Species). Marxist dialectics and its categories were historically elaborated (as a result of and conclusion from the whole history of cognition) above all on data from society and social science. This does not mean, of course, that no account was taken of natural science data, which had an important role to play even at the earlier stages of the formation of dialectical materialism; one need merely recall the "three great discoveries" in natural science and their importance for the formation of materialist dialectics, as Engels said. The formulation of the dialectico-materialist theory of development and its categories was given its supreme expression in Capital, with the use of data from social life.

Marx believed that a fuller and deeper knowledge of an object was gained at the higher point of its development. It is not surprising, therefore, that in the analysis of the dialectic of social development--the most complex form of the motion of matter--many categories like law, contradiction, necessity and chance, possibility and reality, content and form and others, were most profoundly expressed in general philosophical terms as the general dialectical regularities of motion. That is why Lenin required that the utmost use should be made of Marx's Capital precisely in formulating the theory of dialectics, logic and epistemology, and their categories.

Later, after the publication of Volume One of Capital, philosophical categories were further developed and given concrete expression in the works by Engels on the dialectics of nature, and in the early 20th century Lenin's works about the revolution in physics and the attendant crisis and also in the works of the founders of Marxism-Leninism in the field of social science. But this research was invariably based on the logical apparatus produced by Marxism through its analysis of the dialectic of social development.

Thus, the categories of dialectical materialism are a synthesis of the whole of human cognition in the natural and social sciences, being forms of thought most fully and deeply concentrating mankind's experience in the practical mastery of nature and social life.

It follows from what has been said that any further enrichment and development of philosophical categories must necessarily rest on the aggregate experience in human cognition and practice. There was good reason why in his article "On the Importance of Militant Materialism", Lenin bequeathed to Marxist philosophers, alongside the study of the latest advances in the science of nature, the development of dialectical materialism on the strength of data from contemporary history, especially social revolution.

3.

I think that two principal ways in the development of materialist dialectics can be brought out. The first is the concretisation, deepening and specification, under the impact of current processes, of the already available categories which constitute the basis of the present-day logical apparatus of thought and cognition. The second is the formation of new categories. Let us stress at this point that in the philosophical writings of the founders of Marxism, notably in Lenin's works, both these modes of development of the system of categories in materialist dialectics appear as an indissoluble unity.

The revolution in physics at the turn of the century brought about a fundamental break-up of the contemporary scientific notions of matter, motion and causality, producing idealistic vacillations among many scientists and leading to attacks on philosophical materialism. In those conditions, Lenin believed that there was need for more than a mere defence of materialism (to which many Marxists of the day, including Plekhanov, inclined), namely, a rethinking and development of the philosophical categories of dialectical materialism in the light of the important revolution

going forward in natural science. There was good reason why at that time he gave a reminder of Engels' fundamentally important idea that philosophical materialism should assume a new form with every discovery marking a new epoch in the development of science.

There is no need to recall that Lenin brilliantly fulfilled this highly important task of the period. In the context of this article, let us merely add that he made a new analysis of a number of fundamental philosophical categories--among them matter, space, time, causality and motion--and gave these "old" but "evergreen" categories the form which helped to explain in the light of dialectical materialism the latest discoveries in the field of physics and also invested these categories with the greatest heuristic importance, which has been borne out by all the subsequent history of natural science. The importance of Lenin's new formulations should also be seen to lie in the fact that on the strength of the new data he developed the philosophical content of these categories, deepening their content as logical categories, which made it possible to think about the new scientific facts and which provided a method of approach and research. In so doing, Lenin did not rank as philosophical categories the many new natural-science concepts, while making extensive use of them for the purposes of his philosophical, epistemological analysis.

The philosophical, logical content of an important category like matter, which Lenin showed in profound terms, did not lose anything of its fundamental importance against the background of the latest revolutionary discoveries in quantum physics; even today it provides the only correct way for the philosophical, dialectico-materialist interpretation of the most unexpected and "fantastic" notions about nature, erecting a strong barrier against the penetration of idealistic views into science. Indeed, there have been so many attempts to "ontologise" the philosophical concept of matter, which Lenin explained, and to reduce it to a content borrowed from the latest physical theories. But the futility and

even the danger of such attempts lies in the fact that they tend to obliterate the distinction between philosophical and natural-science categories, lead to a positivistic dissolution of philosophy in special theories, and to a loss by the categories of materialist dialectics of their logical character.

The revolution and crisis in physics produced the need to make a fresh study of the historical and logical way of cognition, of the complex and dialectically contradictory advance of human knowledge towards the truth. In carrying out this research and developing the views of Marx and Engels, Lenin gave a clear-cut formulation of the category of reflection, while substantially enriching the content of the categories of objective, absolute and relative truths.

No one will deny that Marx and Engels laid the foundation of the theory of knowledge, including these categories, because there can be no epistemology of dialectical materialism that does not rely on a recognition of reflection and that does not proceed from the dialectical character of the development of truth, etc. But, as Lenin observed, the problems of epistemology in the works of Marx and Engels were not brought to the fore because of definite historical conditions; they acquired this importance in connection with the revolution in natural science. It is, in general, wrong to assume that the emergence of new categories means the emergence of something that has not existed earlier, even in embryonic form. It is also quite natural for new categories to take shape in such a way that a range of questions, which have been in the background for objective reasons and have not required any special analysis, acquires primary importance in the new conditions, whereupon their elaboration is summed up in the formulation of new categories and in the specification and enrichment of the content of categories in earlier use.

The great changes in science and technology and the deepening of the worldwide revolutionary process in our day

quite naturally call for a further development of philosophical categories. This includes the inevitable element of maturing prerequisites required for a new and more profound analysis of categories. This process cannot be artificially whipped up in a purely speculative manner. It implies active and conscious study of new phenomena, new scientific data, new scientific methods, approaches, to produce a basis for possible conclusions connected with the need to enrich the categories of dialectical materialism.

The development of reflection, a fundamental category of dialectical materialism, is highly instructive.

At the turn of the century, this category, it will be recalled, was the subject of a struggle between materialists and Machists. Being idealists, the latter proclaimed sensations to be primary with respect to matter, thereby denying the materialist principle of reflection and accusing the materialists of being unable to solve the problem of how sensation originates. The Machists expressed their own "solution" through the speculative construction of a "new" category, the one they called "element".

Lenin proved that this "category", put forward by the Machists, was only an apparent novelty, or discovery, but was in fact an empty thing producing the false notion of some solution, or advance in the matter of the origin of sensation. No philosophy, he said, can solve a problem "before enough data for its solution has been collected".¹¹ Lenin used the heuristic importance of the truly scientific philosophical category of reflection in studying this problem and put forward his well-known proposition that one could only assume the existence of a capability similar to sensation, the capability of reflection in the "foundation of the structure of matter". In this context, he wrote:

¹¹ V.I. Lenin, Collected Works, Vol.14, p.45.

"Materialism clearly formulates the as yet unsolved problem and thereby stimulates the attempt to solve it, to undertake further experimental investigation. Machism, which is a species of muddled idealism, befogs the issue and sidetracks it by means of the futile verbal trick, 'element'."¹²

In our day, science has already accumulated the data and staged experimental research necessary for a true advance on the question of the origin of sensation. A tremendous role has been played here by physiology, psychology, cybernetics and the theory of information. An assumption drawn from the principle of reflection and stated as no more than a hypothesis becomes a scientific truth. But the point is not only that in modern science the category of reflection has acquired an incomparably greater cognitive value than ever before, and that the principle of reflection is now penetrating into fields where its earlier application would have been considered a curiosity (say, the science of inorganic nature). The point is that the category of reflection is itself being enriched, becoming more concrete and revealing fresh facets.

Let us note, in particular, the great importance of the concept of information in the development of the category of reflection. Whatever the ultimate relationship between these two concepts--a matter which is still debatable--one thing is clear and it is that the concept of information allows a deeper insight into the content and substance of the principle of reflection and its mechanism, helping to understand the role of reflection in the historical evolution of matter, to bring out and determine the stages in the development of reflection, connect reflection with the governing function of the higher forms of matter, etc. These questions are being intensively studied in Marxist philosophical writings.

¹² V.I. Lenin, Collected Works, Vol.14, p.46.

Contrary the assertions of those today who seek to overthrow the theory of reflection, Marxism has always seen reflection as an active process. New scientific data not only confirm this but also provide additional material showing that on the level of living activity there is the basic cell, which explains the substance of reflection itself. Of course, the activity of reflection is best expressed and acquires a qualitatively new content on the level of human thinking and practice.

The scientific and technological revolution is characterised by a tremendous growth in the importance of mental labour in every field of social life. By releasing man through the use of cybernetic devices from the performance of mental "spadework", it stimulates that aspect of human thinking which is usually called creative. The subject has always had an important role to play in the dialectical "object-subject" relationship, but this is especially enhanced in present-day conditions, when the purposeful transformation of nature and social life increasingly becomes the sphere of man's free, conscious activity.

In this connection, the category of reflection, understood in the more narrow sense of the term as the conscious reproduction of reality in human thinking, is enriched and concretised with features and properties like the growing abstractive activity in thinking, the increasing release of cognition from the anthropomorphic element, the complexification and specification of the forms and means of logical analysis in combination with the growing role of creative imagination, greater possibilities for mathematical and other forms of simulating the objects being studied, material and mental experimentation, etc. The study and elaboration of this aspect of the category of reflection and the theory of reflection as a whole is an extremely pressing task.

We find the same process of development, deepening and concretisation of philosophical categories when considering the category of causality.

Many will still remember the debates and discussions produced by the urge on the part of some natural scientists and idealist philosophers abroad to reject the causal character of the processes taking place in the microworld. Nor can we say that these attempts have ceased altogether. A deeper penetration into new and unknown layers of matter has shown the mechanistic concept of determinism to be untenable. At this point some physicists, even leading men revolutionising their special fields, revealed their philosophical weakness: instead of rising to the dialectico-materialist view of determinism in explaining causality, they sought to discard the principle of causality altogether.

The dialectical concept of causality, which Marxism formulated above all on the strength of data from social life, is now also being accepted by the natural sciences, this providing fresh evidence and confirmation of the profound unity of the laws of the objective world. Unfortunately, this is not infrequently lost sight of in the philosophical writings dealing with the development of the category of causality in present-day conditions. Some say, for instance, that in the past the mechanistic theory of causality used to prevail, while the difficulties produced by the need to explain the specifics of the microworld made it necessary to develop and express the old concepts in more concrete terms and so to go on to a more general and more profound theory, that is, the dialectico-materialist theory of causality.

There is no doubt that the development of physics has gone precisely in that way. Confronted by the incredibly more complex world of matter, it had to produce the new, dialectical concept of causality from its own experience, and to suffer the attendant "birth pangs". But this process could have been much easier and less painful had scientists had a knowledge of the already formulated dialectico-materialist concept of causality, which shows what has now been discovered also in the motion of material microparticles--the simplified model of the Laplace-type determinism, the

connection and interaction of causality with categories like necessity and chance, possibility and reality, the one-sided view of causality as a purely linear link-up of causes, the dependence of causality on the conditions and their change, and the consequent probability, statistical character of regularity, the dialectical, not the grossly unambiguous, relation between cause and effect, etc.

Only on the strength of the categories of causality, law and others dialectically studied by Marx and Engels and developed by Lenin have the representatives of dialectical materialism--both philosophers and physicists--been able to show the inconsistency of the view of causality taken by the so-called Copenhagen school, to give rebuff to the idealists, who made use of the difficulties in explaining the unconventional forms of matter for the sake of combating materialism, and to make a tangible contribution to the study of this question on the basis of new scientific data.

It goes without saying that the latest experience in scientific development does not merely serve to confirm the truth of the dialectical categories of causality and law, but is of substantial importance for their further creative development and for a clarification of various aspects not adequately revealed before. We should especially like to stress the importance of the new methods of cybernetics, biology, physiology, psychology and other sciences and also of modern social science for the development and concretisation of the concept of causality as a universal interaction, for the systems analysis of objects, study of their structure, etc.

The concept of "law-tendency" is now being increasingly applied to physical processes in writings on physics. But it was Marx who first used the concept in his Capital, showing that because reality is a fabric of a great number of interweaving and conflicting phenomena and processes, so that necessity cannot have any single expression, laws appear and operate as "laws-tendencies". That is, indeed,

the typical picture of reality in general. This means that the operation of laws as "laws-tendencies" is a general dialectical regularity which we find in nature and in society. Engels showed this by taking the example of Darwin's theory of the origin and development of species, when he criticized the mechanistic, fatalistic theories of causality and necessity. Of course, here there is need to take account of the distinction between blind nature and society, in which men endowed with will and consciousness act, a fact which leaves an imprint on the expression of laws in these different realms of the objective world.

What has been said about the categories of reflection, causality and law applies to other categories as well. Each, going through the crucible of modern science and historical practice, and serving these, becomes more developed. Our concepts of the central category of dialectics--the category of contradiction--have been considerably enriched as a result of the revolutionary transformations in the social system that have been and are being implemented, the emergence of the two opposite world systems and the struggle between them, the forms of leap, and the relationship between the categories of the general and the particular. However, Marxist philosophers are still faced here with a number of problems requiring thorough and comprehensive study.

4.

As the categories formulated earlier are specified and developed, new categories are also formed. Above we have said that this process is not an artificial one and is determined by the real requirements of developing science and practice. That is why only a comprehensive and profound analysis can help to obtain the right orientation in this complicated matter.

Some philosophers say that a "categorical explosion" is just now required. Indeed, some writers have proposed the introduction of "new philosophical categories" into dialectical materialism, like "absoluteness and relativity of

motion", "state as movement running its course", "stability and change", "relativity of the concrete", "evenness and unevenness", "real infinity", "function", "isomorphism", "symmetry and asymmetry", "certainty and uncertainty", and many others.

Of course, the urge philosophically to comprehend new concepts which have been or are being accepted in scientific usage, is a positive fact. But the proposed transfer, often mechanistic, of various concepts from the special sciences into philosophy appears to be groundless and is evidence of the existence of some incorrect tendencies in the approach to the development of dialectical materialism. Quite apart from the fact that among the "new" categories being proposed we find some that Marxist philosophy has long been using (for instance, the view of object as a unity of stability and change, the relative character of any concrete phenomenon or process, etc.), such proposals ignore the most important fact, namely, that philosophical categories must be logical, that is, they must be of universal cognitive, methodological significance.

We feel that all of this is due to the erroneous, as we have said, contrast between ontology, as ostensibly an independent "theory of being", and epistemology and logic. In the views on the formation of new philosophical categories this kind of understanding of the relationship between ontology and epistemology results in the more or less general concepts which are used by many sciences and record some general aspects of "being", of the real world, being raised to the rank of philosophical categories. Of course, categories like evenness and unevenness, symmetry and asymmetry and so on, are highly important, and philosophical science has the right to operate with them as, incidentally, with any other concepts of any special science. But that is not to say that this makes them philosophical categories. Incidentally, the special sciences also make broad use of philosophical categories, but this does not transform the latter into concepts of the special sciences.

To this should be added the fact that some, we think, unsatisfactory proposals for "new" categories spring from inadequate consideration of the extensive possibilities opened up by the existing philosophical categories. Take concepts like "certainty" and "uncertainty", which have also been offered as new philosophical categories. This proposal has been suggested by quantum mechanics (the uncertainty principle), the extensive application of probability-statistical methods of research into nature and society, the theory of information and so on.

However, no one can deny that "uncertainty", that is, the existence of an element of indefiniteness in any given state, uncertainty as a spectrum of diverse possibilities of which only one is realised depending on concrete conditions, etc., all of this is already a part of such philosophical categories as necessity and chance, possibility and reality, and others. In this sense, the concepts of "uncertainty" and "certainty" can and must be used as a facet showing the content of these categories, without, however, proclaiming these to be new and independent categories of Marxist-Leninist philosophy. In general, there is need to reckon with the fact that each logical category is explained and revealed by means of a mass of concepts which, however, do not thereby become philosophical categories.

Explaining the substance of the category of practice and its role as the criterion of the truth of cognition, Lenin made use, together with many concepts, of concepts like "certainty" and "uncertainty", showing that practice is both "certain" in the sense that it is the supreme judge of the truth or falsity of any theory, and at the same time "uncertain" in the sense of being incomplete and historically limited.

In all these and similar instances, the said concepts perform a different and multiple-sense function. If the special sciences have begun to make extensive use of the concept of uncertainty, this merely goes to show the profound

cognitive importance attaching to the categories of materialist dialectics formulated in the course of human history, like necessity and chance, possibility and reality, and others.

The Marxist conception of history, operating with the categories of necessity and chance, possibility and reality etc., indicates the place of the element of uncertainty (without exaggerating it) in studying not only the insubstantial but also the substantial aspects of the social process. Lenin said that if revolutions were undertaken only on the condition of a full guarantee of success, they would be the easiest thing in the world. Here, the Marxist theory of the historical process is based on the dialectic of the above-mentioned and many other categories, which alone make it possible to understand such aspect of reality like "uncertainty". This naturally raises the question: is it right to consider the concept of "uncertainty", as introduced in a number of special sciences, as a philosophical category? I think that this is hardly advisable, but I must stress that this is my own view.

At the same time, some concepts undoubtedly deserve close scrutiny to see whether they could be included within the system of philosophical categories. But which these are and what their connections are with the existing categories, how they fit into the system is a matter that requires profound, comprehensive and, we should say, circumstantial analysis. In this article it is, of course, impossible to consider this question with an array of arguments. Our purpose here is to comprehend the Marxist-Leninist approach to its solution.

It is quite natural that new (or relatively new) modes and forms of cognition, new concepts, like the methods of modelling, mathematical hypothesis, the study of objects as complex systems, the extensive use of symbol systems, etc., tend to originate and develop in present-day historical practice and science. They arise on the basis of cognition

of various new fundamental properties of the real world into whose mysteries human thought penetrates ever more deeply. In other words, these forms of thought arise and progress in close connection with the forms of being itself, which is being comprehended with ever greater profundity by the human mind.

In this context, the problem of new philosophical categories should be comprehended and tackled as a problem of the philosophical generalisation of new historical development and new forms and methods of cognition, as a problem of bringing out not the particular but the universal, substantive principles of being and the corresponding logical forms of reflection, as a problem of reproducing reality in thought. In his synopsis of Hegel's The Science of Logic, Lenin expressed his approval of the metaphorical comparison of philosophical categories with "ganglions", nodal points of cognition. They reflect the "solid nodules" in the immensely complex network of the objective world and men's practical activity, owing to which reality appears not as some chaotic agglomeration of phenomena and events but as a law-governed process of development. In consequence of this they also constitute the basic principles and lines of human cognition regardless of its concrete forms. That is why Lenin defined categories as rungs in the cognition of the world as nodal points "in the web, which assist in cognising and mastering it."¹³

This view of categories and this approach to the definition of their functions and role contain the most substantial and most important theoretical prerequisites for a correct solution to the problems arising in the formation of new categories, prerequisites for a concrete application of social practice and science in accordance with the present-day requirements.

¹³ V.I. Lenin, Collected Works, Vol.38, p.93.

To sum up what has been said, the main thing, we believe, is that in tackling the question of the development of the categories of dialectical materialism one should start from the correct, Marxist-Leninist understanding of the place and importance of philosophical science among the other sciences and, consequently, of the specifics of its categories and their philosophical and methodological functions. This means above all that in the development and concretisation of the system of categories worked out by the whole history of cognition and the formation of new categories there is need to rely on the whole of modern experience and to carry on this effort with an eye to maintaining the specifics of philosophical categories, the categories of materialist dialectics, without obliterating the distinction between them and concepts in the special sciences. Only then will their role, the role of dialectical materialism in the development of human cognition and practice be further enhanced.

The question of criteria for determining what is a philosophical, logical category, in contrast to special concepts, undoubtedly requires further discussion and allround elaboration. However, the main criterion, enabling us to distinguish between philosophical categories and general concepts in the special sciences, is undoubtedly the principle of the unity of dialectics, logic and the theory of knowledge, according to which logical, philosophical categories are universal forms of development of thoughts and cognition of the world only to the extent that they express universal forms in the development of being.

ORGANIC DETERMINISM, TELEOLOGY
AND THE PURPOSIVE APPROACH IN RESEARCH

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The share of theoretical research in modern scientific cognition tends sharply to grow. Now that we have entered the "age of biology" this process is revealed perhaps in the most characteristic form in the attempts to construct a generalising theory describing the basic regularities of living systems, with the inevitable resort by the scientists to the fundamental principles of the theory of knowledge, and an analysis of the heuristic potentialities of the traditional and new methods of research in their interconnection and interdependence. Among the principles most intensively discussed over the past few years are the principles of causality, determinism in their specific expression, notably, in biological cognition in connection with the problem of organic purposefulness and its teleological interpretation.

Unfinished Dispute? Alternatives of
Determinism and Teleology

A fresh impetus to the discussions of the "eternal" and truly crucial problem in biological cognition is provided by various concepts which have sprung in the course of the theoretical interpretation of data from molecular biology and biocybernetics. The philosophical generalisation of these data has also produced a complex spectrum of views,

including those of a frankly mythological character. It has also gone hand in hand with some "sensational" statements by Marxist philosophers concerning teleology which fall easy prey to those who see no meaningful problems in this area.

This seems to be to some extent an inevitable process because it is connected not only with the conscious but also with the spontaneous dialectisation of biological cognition as it becomes theoretical. In the process, while the dialectico-materialist basis of science is being consolidated and developed there may appear numerous myths, and now and again one observes a sheer lack of professional grounding in philosophy, a probability which undoubtedly tends to grow in such conditions. At any rate, it is hard to explain--without, of course, going beyond the framework of science--the various attempts, sometimes even formal terminological attempts, to eliminate the alternatives of determinism and teleology in interpretation, notably, of the problem of purposefulness. Indeed, while modern approaches may be novel, such attempts are closely connected with definite traditions in comprehending and explaining the problem in the history of philosophy and biology, traditions which cannot be ignored.

It is a historical fact that in the positive plane the problem of purposefulness was mainly discussed within the framework of idealistic philosophical conceptions, while materialism--in its mechanistic form--mostly responded in the negative to the available teleological treatment of the problem, without now and again considering the substance of the objective facts behind it. But it was within the framework of materialist philosophical conceptions that approaches were formulated making it possible to clarify the true causes of the phenomena considered as purposeful. While the teleological standpoint, resorting to the anthropomorphisation of natural processes (in its extreme forms it is embodied in religion), extended the specifically human phenomena of purposefulness and target-setting to the whole of nature, thereby insisting on its "primeval purposefulness",

materialism from the outset quite clearly raised the question of the limits of purposefulness and its relative and historical character. This was achieved within the framework of determinism as the alternative to teleology.

Even in the ancient period, the polarisation of determinism and teleology in tackling the problem of purposefulness was sufficiently well revealed, and it is safe to say that even then the main lines of the divergence which were to run across the centuries to our own day were already brought out. Subsequently, as in that early period, it became clear that determinism in its mechanistic form was unable consistently and completely to explain the problem of purposefulness. On the other hand, teleology, while on the whole presenting a distorted interpretation, succeeded in its classical forms (the immanent teleology of Aristotle, Leibniz, Schelling and especially Hegel, and Kant's "heuristic" "regulative" teleology) in establishing some dialectical aspects of the problem which tend to drop out from the mechanistic causal nexus. The advance in the scientific interpretation of the problem of purposefulness, therefore, historically occurred not only along the lines of criticism of teleology but also with due account of the facts of the objective existence of purposefulness in nature, which it brought out and idealistically distorted. Of course, it was just as necessary there to criticise the limitations of mechanistic determinism and to try to dialecticise it as well as to contrast teleology to the materialist explanation of the problem of purposefulness.

Teleology, developed within the framework of idealistic systems but on the basis of dialectics, continued to contain within itself a rational meaning until it was dealt the death blow in philosophy with the emergency of the conception of dialectico-materialist determinism, and in biology--with the appearance and development of Darwinism. Indeed, teleology continues even today to insist on its need as "a scientific principle" only because the dialectical view of the functioning and development of complex systems

has been inadequately elaborated. In essence, it turns out to be the obverse of mechanicism in the methodological comprehension of the principles of cognition of the interaction between complex systems. The important point here is not only that the inadequacy of the mechanistic standpoint leaves for idealistic speculations a vast array of facts which it cannot scientifically analyse: teleology in itself implies mechanicism, which it methodologically "supplements".

This is clearly seen in biology, among other areas, where teleology and finalism have proved to be most resilient and where the mysteries of their "fresh revival" are still being performed. It will be seen, for instance, that mechano-Lamarckism, with its principle of single causality in the interactions between the organism and external conditions is being "supplemented" by psycho-Lamarckism, which introduces ideal "governing factors" allegedly determining the interaction between organisms on the "teleological principle". In biology, mechanicism is also built up by numerous versions of vitalism with which "teleological thinking" is connected, one might say, genetically.

The appeal to the "governing factor" acting on teleological lines now springs from the mechanistic interpretation of the theory of natural selection, as one will find in the writings of many advocates of "neofinalism", or, for instance, of the data of molecular biology and cybernetics as has been done by G. Schramm and E. Sinnott, among other Western scientists who look to the ideas of vitalism and panspsychism.¹

This, is, of course, an extreme case, which literally amounts to mythology on the cybernetic level. However, it turns out that other and more "weakened" forms of substantiation of the "necessity" for research to turn to teleology

¹ G. Schramm, Idee und Materie in der modernen Biologie, Bremen, 1963; Edmund W. Sinnott, The Bridge of Life, New York, 1966.

are most widespread. That is why in considering the views of various advocates of such conceptions, especially those among them who are natural scientists, care should be taken to maintain the concrete historical approach. After all, in many instances they can, however inadequately, express a protest against the narrowness of the mechanistic principles of research into living systems (while, it is true, turning them into absolutes and identifying them with materialist principles in general) and may be moving towards a development (deepening and extension) of the forms of biological cognition.

However, these tendencies, which have not broken with the needs of biological cognition, have also been brought out in forms that are adequate to science and that maintain the alternatives of determinism and teleology and rule out any semblance of solid argument in favour of the need to turn to the latter. Such forms are the specific features of the conception of the organic determination of living systems, established on the basis of the conception of dialectico-materialist determinism and the theoretical conceptions of biological science.

The conception of organic determinism complicates various types of bonds by producing the comprehensive characteristics of causal connections (not only dynamic but also static) and taking account of their immediate and mediated effect, the unilinear (unidirectional) and cyclical (interaction) character. It makes it possible to determine the general methodological approaches to analysing systems with different degrees of structural and functional organisation and specific forms of internal and external interactions. The important thing is that this conception of determinism embraces all the existing forms of analysis of purposefully organised systems and purposeful processes where "teleological thinking" in its different versions was assumed to be competent.

Within the framework of this conception (whose basic features I have already had occasion to describe elsewhere)

account is taken of the specific features of the interaction of organisms as organically integrated systems, of their activity, adaptive trends, etc. It also helps to answer the question about the nature of these internal and external interactions in their relationship to the principle of causality and purposefulness.

Specifics of Organic Determination in the Light of Cybernetics

In modern science, this general problem, connected with the need to bring out the specifics of organic determination of living systems is tackled both within empirical research and within the framework of theoretical generalisations of an extremely extensive class. This applies, in particular, to the general theory of systems on the basis of whose propositions attempts have already been made to produce a symbolic presentation of the changes within a system which is some distance away from the state of equilibrium but, in a sense, "striving" to attain that state in the future. In this context, L. Bertalanffy characterises the living systems as "equifinal", that is, as being capable of achieving a similar final result practically regardless of initial conditions. This property of "equifinality", which H. Driesch brought out vitalistically and interpreted teleologically, is associated in modern science with the special character of the interaction of living systems, their activity, the specifics of the processes of regulation and control, which are being intensively studied above all by biocybernetics.

Without going in detail into the concepts established by cybernetics and connected with the control of self-organising systems, coding, information transfer, etc., let us recall the most essential characteristics of self-regulating and self-governing systems, which also include living systems. These relate above all to the capability of modifying their state under the impact of information signals, that is, the capability of selective response. Complex systems of

this type also have the capability of memorising the best effect of earlier responses, which is why they are characterised as self-regulating and self-teaching systems. Such systems can receive information signals from other systems and the environment and transmit them after an indefinitely long interval of time. They are capable of modifying their working algorithms and their own organisation depending on changing information signals, which ensures not only the survival of these systems, the self-reproduction of the organisation achieved, but also their improvement and development.

It was also highly essential that self-regulating and self-governing systems realise these characteristic properties with the aid of feed-back mechanisms (that is, a continuous exchange of information between the governing device and the executive organ). Self-regulation is effected in the form of a cyclical process which runs along a closed circle. The feed-back can also exist in the form of a fixed device with the character of secondary regulation built up over the primary dynamic interactions between processes in complex systems. But these primary interactions also ensure a feed-back effect, even if indirectly. This means, for instance, that living beings with a developed nervous system effect feed-back ensuring the processes of self-regulation in the form of signals which are sent back to the central nervous system. But there is also a feed-back effect in intracellular processes, biochemical interactions between individual structures of the genotype and the phenotype, etc. This is also effected in populations in their relations with their environment and within the biosphere as a kind of extensive-class integrated system.

These characteristics of complex systems, brought out by cybernetics, are of universal importance. They will be found in any directed process of active adaptation connected with the selection of the optimal variant for modifying the structural or functional properties of a system. It goes without saying that these changes themselves have many

values and their overall trend, which is realised integrally, has a statistic, probabilistic nature.

In this sense, these cybernetic characteristics are brought out in the analysis of biochemical processes of living systems, in their molecular-genetic interactions. This is most clearly revealed in the mechanism of protein synthesis, where an exceptional role belongs to DNA molecules, the carriers of the genetic (heredity) code, in accordance with which molecular synthesis is effected and the cells and the living system as a whole are ultimately self-reproduced. The information coded in DNA whose loci are formed by genes, is a programme of genetic processes and their realisation in the development of organisms as individuals and as a species. The concept of the genotype of the individual as a peculiar "programming device" has helped to gain a deeper understanding of the biological importance of heredity information in organisms as a concentrated and duly coded flow of the influence of the environment throughout the individual life of organisms and the historical development of their species.

This makes it clear why organisms which have travelled a more complicated evolutionary path and whose heredity has taken shape under the impact of the most diverse factors of the environment have the most diverse information. That is why, in their responses to its changes they display the maximum activity and are capable, with the aid of fixed secondary regulation devices, of working out oriented adaptive restructuring of their organisation and behavioural acts as is the case, in particular, among the higher animals with a developed nervous system.

This growing activity of living systems is simultaneously connected with the increasing switch of self-regulation mechanisms to individuals, whereas this kind of "individualisation" is much less frequent, say, among plants, where the basic self-regulation (and evolving) unit is the population, the species. As for the individual, while in-

formation processes are effected through it, it itself exists as a peculiar "variant" in the course of "selection" by the population of optimal values of adaptation in new environmental conditions. This is what is fixed in the concept of natural selection, in its statistical action, which is only possible when it comes to an ensemble, a definite discrete set, which is the more effective the greater the diversity achieved in the types of structuring living systems and their changes.

Still, the initial primary mechanisms, which results not only in self-preservation but also in the self-improvement of living systems, and in morphophysiological and adaptive development, are formed on the individual level. On this level are created the prerequisites for adaptive responses, their "thematic orientation", which is realised in the population by means of selection.

Adaptive actions, whose forms may be either genetically coded (programmed) in accordance with a definite scheme or may be worked out in the course of individual life, are characterised as being oriented precisely because they are determined by a definite programme with an unusually large information capacity. Indeed, one may even say that this programme is excessively complex. This becomes clear if we consider the exceptional complexity and the inexhaustible "inventiveness" of the environment in which organisms carry on their vital and adaptive behavioural activity, and which determines, in vigorous interaction with this activity, the formation of the complexity of the programme itself.

That is why the programme coded both in the genetic heredity structures and in the physiological systems with a fixed acceptor of the result of action (P. Anokhin) may appear as the "anticipatory model" of an action not yet performed, as its result. Cybernetics must be credited above all with having shown the possibility of such models existing in nature by giving new facets to the understanding of the problem of purpose and purposefulness in the overall dialectico-materialist and anti-teleological framework of

their scientific explanation. Where teleology saw the idealistically interpreted action of "final causes", "rational purposes", etc., cybernetics established the material causal relationship, having shown in strict scientific terms and in complete accord with Darwin's theory, the more general grounds for treating purposefulness in nature as a material relationship. In this way it has preserved and rationalised the objective meaning of this relationship, having carried on Darwin's effort in research into the material causes of purposefulness in nature. At the same time, expelling teleology from what might be called the "inside" of purposefulness itself, cybernetics has more than mechanically drawn a line, for instance, between organic purposefulness and man's purposeful activity. By analysing their common principles as mechanisms for realising oriented processes in self-governing systems, it has clarified the "rational" meaning of the ancient analogy between the adaptive functioning and development of living systems and purposeful human activity. Consequently, it has "won" a vast empirically existing bridgehead which science has traditionally bypassed, believing it to be firmly held by teleology, its age-old adversary.

It is of essential importance, however, to understand how cybernetics has achieved this aim. Here we now and again find some solutions, at first sight totally unexpected, which cannot be in any way ignored.

About "Inner Purpose" and "Purposeful Causality" in Nature: Myth and Reality

According to one such solution, the whole thing boils down to a purely semantic problem, which is to lift the "ban" on the use of the terms "purpose" and "purposefulness" to extend their meaning to well beyond the limits of man's conscious activity. That is, indeed, what cybernetics is said to have produced in the understanding of the problem of purposefulness.

Unfortunately, the "grounds" for such conclusions are sometimes constructed with reference to scientists who, in effect, use the terms "purpose" and "purposefulness" in this extended sense, losing sight of the fact that this is frequently no more than a way of expressing phenomena whose explanation calls for a different system of concepts and terms. In Soviet philosophical writings, this is most frequently done with reference to the works of N. Bernstein, who, it will be recalled, tried by means of biocybernetics and the concepts of code and coded anticipatory "model" of the "required future", to give a materialist explanation of how in living systems the task or purpose of the action may be the cause of the action itself. According to N. Bernstein, purpose, seen as a model of the required future coded in the brain of the organism, determines the processes which should be brought together in the concept of purposefulness. The latter includes all the motivation of the organism's struggle to achieve this aim and results in the development and establishment of purposeful mechanisms for its realisation. The dynamics of the purposeful struggle by means of purposive mechanisms is a complex which is best covered by the term "activity".²

Let us add that the emphasis on the activity of organisms constitutes the main distinction between the dialectical and the mechanistic view of biological interactions. But it should be borne in mind that for a long time it was presented as a "monopoly" of vitalism and teleology in contrast to materialism and determinism. Indeed, the terminology describing active behaviour has been shaped mainly on that basis. In Darwin's theory and the subsequent development of the science of life--especially molecular biology, the genetics of populations, etc.--on the one hand, and in the materialist explanation of the nature of human activity, the emergence of consciousness and the substance of historical

² N. Bernstein, "Towards the Biology of Activity", Voprosy filosofii, No.10, 1965, pp.69-70 (in Russian).

process, on the other, decisive steps were taken not only to invest the concept of purposefulness with a "new meaning", as Timiryazev put it, but also to purge science of terms which explain nothing but mostly pollute the language, and which are used by direct analogy with purposeful human activity.

Cybernetics, as I have already said, adopted this analogy but not for the purpose of translating the functions and development of organisms and artificial self-organising systems into the language of human activity, but in order to find common objective relationships in them and so "eliminate" the task as such. That is why there is need to analyse the new content cybernetics has found in the phenomena designated by the terms "purpose" and "purposefulness", and how it designates this content regardless of the initial terms, instead of seeking to re-establish, in biological science in particular, by references to cybernetics, a terminology creating no more than a semblance of explanation and failing to take account of the qualitative distinctions between the different levels of matter, without which the language of science cannot effectively "work".

However, the terminology of the "biology of activity" to some extent ignores this experience in the historical development of science. What is more, it is even assumed that this terminology can, in effect, distinguish between the modern biocybernetic approach from the "mechanicism" in the past stage of the development of science as well. And as it frequently happens these ideas are carried, not in the works of the scientist himself who has put forward this or that concrete complex of ideas, but in those of his interpreters, to the point of "logical completion" bordering on what could be called "mythology on the cybernetic level". There you will find direct statements about some "inner purpose" with reference to the "materialistically interpreted" doctrines of Aristotle and Hegel, and to dialectical materialism to boot. Indeed, some advocates of "inner purpose" have expressed dissatisfaction over the fact that in

cybernetics the concept of programme has replaced the concept of "inner purpose". In this connection there is criticism of the denial of the possibility of extending the purposefulness principle to the sphere of consciousness, it being suggested that the "restrictions" on the category of "purpose" should be "eliminated" and that the "purpose of selection", including that among plants, should be considered as an "inner material purpose" in contrast to the aims which appear in an ideal form and of which man is aware. All of this is, as a rule, concluded with a flat recognition of "purposive causality" in nature in the spirit of the "materialistically interpreted" doctrine of Aristotle.

True, one should bear in mind that somewhere before these ideas are put forward (rather, simply through the use of definite terminology) the real content of the new concepts which cybernetics has brought to science is, as a rule, taken out, thereby establishing the general principles governing the functioning and development of self-regulating systems with feed-back. The reference here is, in particular, to the concept of the material code model ("model of the required future", according to N. Bernstein). That is why the subsequent urge on the part of the interpreters to designate this model, for instance, as the "inner purpose" of a plant is altogether incomprehensible. After all, by using the term "inner purpose", we cannot help, despite its "new meaning", to visualise the vital activity of plants in terms of purposeful human activity. But is that the object of using cybernetics in biology?

Of course, generally speaking, the processes in self-regulating systems in their interaction with the environment, the feed-back mechanisms, regardless of the substrate basis on which they are realised, may in a certain relative sense be characterised as some relation of purposefulness, because it implies the establishment of a correspondence, a reciprocating influence of the final effect, of the result of the process on its beginning. The principle of regulation and control in "equifinal" systems, capable of maintaining an

optimal dynamic equilibrium despite any external or internal disruptions, ensures this dialectical interaction of processes and their stages, which in definite relationships appear now as cause and now as effect. In this way the relation of purposefulness appears as a peculiar form of interaction, a special type of link within the framework of dialectico-materialist determinism.

The concrete mechanisms of this interaction in nature, divided in the linear plane, produce a picture of the relative--statistically realised--orientation of the processes and their determination by the final factors which appear as aims. However, these are not conscious aims but merely their analogues, which are objective in their very nature. That is why it is possible to discuss whether the concept of purpose and purposefulness is at all applicable in this area. Engels held that "even the application of the Hegelian 'inner purpose'--i.e., a purpose which is not imported into nature by some third party acting deliberately, such as the wisdom of providence, but lies in the necessity of the thing itself--constantly leads people who are not well versed in philosophy thoughtlessly to ascribe to nature conscious and purposive activity."³

On the other hand, of course, the point is not that the concepts of purpose and purposefulness are anthropomorphic in themselves.

Men have no other language except human language, and many terms which we use to designate processes in nature are highly relative precisely because they are anthropomorphic. But this does not make them less effective in the heuristic sense. Still, "multiplying substances" without need, and artificially introducing multiple meanings into the terminology of science seem to be hardly justified in our day, with the growing urge for precision. That is why we should also be extremely cautious in using the term "inner purpose",

³ F. Engels, Anti-Dühring, Moscow, 1969, p.84.

bearing in mind the extent to which "the whole inner purpose is itself an ideological determination," as Engels put it.⁴

Summing up what has been said, we have reason to state that cybernetics does not introduce the concept of purpose into the science of living systems and does not invest it with a boundlessly extensive meaning by stripping it of anthropomorphic and biomorphic elements, but merely finds material analogues and purposes in the objective characteristics of self-regulating systems, designating these by means of information and feed-back terms, that is, producing semantic invariants of purpose. Is it at all useful to convert these invariants into the initial ones which had served as the starting points for analogy? Is it not better to retain the term "purpose" only in its immediate, specific sense, which is connected with the comprehension with an ideal notion of the final results of activity, leaving the relative use of the term to characterise natural processes, as relative, for instance, is the concept of organic purposefulness?

Consideration of this question could also be continued in application to the concept of "purposeful causality" in nature. Cybernetics has provided a materialist explanation for the specific links and interactions, for instance, in living nature which teleology had presented by direct analogy with human activity in the spirit of finalism, implying that material processes in living systems were determined by an ideal "final purpose", etc. There again it also made use to the end of the "rational meaning" contained in the analogy, taking it to mean only the beginning, the starting point of cognition, and not its completion, as in finalism.

The results of this cognition, expressed in information and feed-back terms, are in complete accord with the conception of dialectico-materialist, organic determinism, helping to enrich and develop it. It is, accordingly, established that in the functioning and development of self-regulating,

⁴ F. Engels, Dialectics of Nature, Moscow, 1954, p.278.

self-governing systems there appears a new type of link, which is characterised, in particular, as being cyclical. From the information standpoint, the cyclical connection effected in the form of interaction between differently oriented processes, can be designated either as direct or feed-back connection. In it we observe processes of a peculiar predetermination, fixed in the programme, in the form of a code model of subsequent actions and determining the statistically realised orientation of these actions. The mechanism of such connections itself appears in the form of their "duplication", a superimposition on the objective material process either of its ideal scheme, and epistemological sample--purpose--or of a material programme, a code model, which, it is known, may or may not have a figurative value.

Accordingly, the interactions observed between the various states of a self-regulating system and expressed in the form of causality may be characterised by the concept of cyclical connection between cause and effect (direct and feed-back) of which the so-called purposeful causality is in effect a type. In this way its existence is not denied, but the limits of its applicability, which may be extended, again only in a relative sense, are specified. Is it necessary, in this instance, to pose this question once again: what do we really gain by "transcending the limits" of the meaning of the term? What new knowledge do we gain if we impose--even if only terminologically--for instance, on a plant "selection of purpose", "striving towards an aim", "purposeful activity", and so on?

This is not such a simple question as it may appear to those who are not abreast of the history of the philosophical struggle over the problem of determinism and teleology and who, for this reason may very easily "revise" its lessons. Nor does the question here at all boil down to purely semantic aspects, or to a dispute about words,

although that is also important.⁵ We find that somewhere close to these disputes and sometimes from them stem such forms of "mythology on the cybernetic level" which coalesce directly with teleology and finalism. After all, the discussions on the cognitive importance of teleology have not been taking place in philosophical vacuum, and the recognition (however formal) of the scientific effectiveness of the "teleological principle"--even if only as a definite methodological instrument--may be easily transformed into the assertion about a "revival" of teleology and finalism as a philosophical, theoretico-cognitive conception confronting the principles of determinism in their dialectico-materialist meaning.

In this context, we feel that one should agree with some Marxist philosophers (K. Gössler, Todor Pavlov, among others) and to admit as being meaningless and confusing not only the calls to create a "materialistic teleology" but also the weaker variant of these calls for another "revision" of the teleological idea of the past and the present, and also of their criticism. The groundlessness of these calls is obvious in the light of the analysis of the history of the formation and development of the conception of dialectico-materialist determinism, which has assimilated all the valuable elements from past historical thought, including the dialectical ideas contained in immanent teleology from Aristotle to Hegel. This is all the more obvious, considering that since Darwin's day until our own day biological science has "sublated" teleology by means of modern methods of research within the framework of molecular biology and biocybernetics, because the methods of biological cognition as a systemic whole are not confined to the cognition of external, single interactions of the mechanical type but are capable of bringing out the forms of connections specific to living systems, including cyclical connections

⁵ Let us recall that Engels criticised E. Haeckel for using the concept of "final causes" when dealing with artificial selection.

which teleology idealistically interprets in the spirit of finalism. These calls have a confusing effect because they tend to direct attention essentially to the search for arguments to justify teleology, which has long since lost its right to exist in science and whose "revival" in modern conditions can be seen only as "epistemological nonsense" which can be understood only when dealing with the views and philosophical language of scientists not consciously taking the dialectical materialist stand, instead of deepening and extending, in the light of the data of modern science, researches into the problem of purposefulness in accordance with the traditions of the materialist critique of teleology.

Let us note that this kind of situation which results at any rate, in formal assertions about a "revival" of teleology and finalism exists in biological science, in particular. Many leading natural scientists, philosophers and methodologists, including those not taking the dialectical materialist stand, have been trying to escape from the situation and to dissociate themselves, even in formal terms, or, you might say, semantically, from teleology and finalism.

Thus, E. Mayr said in a paper at a symposium on theoretical biology in 1966 that biologists have long since come to feel the ambiguity of designating the purposeful behaviour of individuals programmed by the properties of its genetic code as "teleological". He held that "scientific biology has not found any evidence that would support teleology in the sense of various vitalistic or finalistic theories.... The complexities of biological causality do not justify embracing non-scientific ideologies, such as vitalism or finalism, but should encourage all those who have been trying to give a broader basis to the concept of causality."⁶ In an effort to give adequate expression to this "broader basis" in his familiar concepts and terms, Mayr accepts Pittendrigh's designation of the behaviour of systems,

⁶ Towards a Theoretical Biology. 1. Prolegomena, Ed. by C.H. Waddington, Birmingham, 1968, pp.49-50, 54.

"not committed to Aristotelian teleology", as being "teleonomic", confining its use to systems operating on the basis of some programme or a code of information, and taking this to mean "the apparent purposefulness of organisms and their characteristics", as Julian Huxley put it.

Commenting on these considerations of Mayr's, C. Waddington agree with him on the point that the teleological or vitalistic type of explanation was not acceptable and that there was need for "teleonomic", or "quasi-finalistic" explanations, to use the term he introduced. However, he did not agree with Mayr that "natural selection is not purposive. In itself it is, of course, no more purposive than is the process of formation of interatomic chemical bonds. But just as the latter process is the basic mechanism underlying the protein syntheses which are integrated into the quasi-finalistic mechanism of embryonic development, so natural selection is the basic mechanism of another type of quasi-finalistic mechanism, that of evolution. The need at the present time is to use our newly won insights into the nature of quasi-finalistic mechanisms to deepen our understanding of evolutionary processes."⁷

Rejecting teleology, Waddington seeks to interpret the quasi-finalistic explanation of biological processes within the framework of materialism (mechanicism, to use his own term), even assuming that "the general system of concepts which is beginning to take shape... is in a sense close to Marxist dialectical philosophy. ...These concepts," he adds, "correspond more to the dialectical conception of Marx and Engels, than to the conventional simplified materialistic approach to the problems of biology."⁸

Thus, the terms "teleonomy" and "quasi-teleology", or "quasi-finalism", are being presented as alternatives to

⁷ Ibid., p.56.

⁸ Towards a Theoretical Biology, Moscow, 1970, Edited and prefaced by Academician B. Astaurov, p.8 (in Russian).

the teleological interpretation of causality in the spirit of finalism. In effect, they describe the causal relations expressed in the language of cybernetics by means of the concepts of programme and feed-back, that is, they describe cyclical, reciprocal causality, including predetermination of the results of action and a corresponding orientation of the latter. One may, of course, argue about the aptness of these terms, which on the whole still revolve round the initial concept of teleology. But we can well understand the urge to dissociate oneself from it, while retaining the method of research into complex systems through an analysis of the relation of purposefulness which is only nominally qualified as "teleological".⁹

Purposive Approach in Research

The question of this method of research is of importance in itself. It is connected with the heuristic use of the concepts of purpose and purposefulness in the study not only of the processes which could be designated as purposeful in the immediate sense of the word, but even in relative terms, to express their objective orientation. Here the relative nature of the concept of purposefulness of processes, empirically accepted and resulting from the development of the new content in the old semantic form (as we find, for instance, in the case of organic purposefulness), is allowed deliberately as a definite method of research. This implies the so-called purposive approach which is now and again interpreted as being part of a general functional analysis of complex systems of the organic-integrated type.

The "teleological" approach is usually taken to mean the functional approach in its broad sense, which involves the study of processes, the dynamics of the elements of the

⁹ I have already had repeated occasion to refer to this aspect of the matter and to this method of scientific research in my articles and books, beginning with the article entitled "Determinism and Teleology" in Voprosy filosofii, No.2, 1958.

system characterised as a specially stable type of behaviour of these elements (or subsystems), that is, as their derivative function. In biology, from which these concepts historically take root, later to be more broadly applied, function is always the result of vital activity, of the concerted operation of a definite organ (or system of organs), each of which also has a systemic quality that is recorded structurally and dynamically.

Consideration of organically integrated systems and their components in the light of the results of their functioning means bringing out one of the specific properties of these systems. But only in some instances can such consideration assume the form of purposive analysis (and, consequently, be designated as "teleological"), because the concept of function does not always assume the meaning of a definite orientation of processes, to say nothing of their purposefulness.

That is why it is possible to separate the functional approach in the narrow sense of the term (analysis of the behaviour of systems which is unconnected with notions of orientation), the functional purposive approach (analysis of the behaviour of systems characterised as oriented or relatively oriented), and the purposive approach proper, under which the researcher turns to the final stage, to the result of the process as its aim, starting from which the cause is analytically established from its effect.

Hegel wrote that "an understanding of the lower stages requires a knowledge of the higher organism, because it is the scale and the prototype of the less developed ones; considering that in it everything has reached its full-scale activity, it is clear that a knowledge of the undeveloped can be gained only from it."¹⁰ The developed form can be conditionally designated as a purpose, and then the analysis will assume all the characteristics of the purposive approach. Here the purpose appears as something conditional,

¹⁰ Hegel, Works, Vol.II, p.518 (in Russian).

something heuristic, and it is immaterial whether or not this process can be purposeful in the immediate sense of the word. Timiryazev observed that "the task of physiology and the methods of its fulfilment are twofold with respect to the formative process. First, it should seek to show and actually does show (especially in the physiology of plants) the basic mechanism of this process in the experimental way, and second, seeks to explain to itself their final result--the shaping of form, appearing to us as being the implementation of a preset purpose--on the strength of the accumulated effect of these same factors."¹¹

Consequently, the final stage of the process tends to be regarded as its purpose, that is, the functional-purposeful or simply the purposeful approach is realised regardless of the meaning with which we invest the concept of purpose, because the latter appears as the regulatory principle whose potentialities were analysed by Kant. In the purposive approach, the concept of purpose may reflect a real phenomenon (as in the analysis of forms of human activity) and may designate it adequately; it may represent directed (fixing the relation between the initial and the final stages) processes in the form of a material or an ideal model, in the form of theoretical constructions, a purposive hypothesis, etc.

Thus, the purposive approach may be used not only in the study of "equifinal" systems but also in the spheres where one deals with cyclical and oriented interactions, where processes of progressive development are studied. The purposive approach may also be used in situations where the final result of a process may be established empirically. In such instances, it is constructed ideally, hypothetically. Here again the analysis is based on the assumption that the result of the process is ostensibly present in reality in the form of a peculiar purpose. In such an approach, the

¹¹ K.A. Timiryazev, Selected Works in Four Volumes, Moscow, 1949, Vol.III, p.408 (in Russian).

resort to this "purpose" appears as a special method of hypothetical anticipation, description of a process subject to subsequent scientific analysis. In this context, Ivan Pavlov wrote that "in the study of each particular system the idea of possible purpose is not the final aim; it can only serve as an additional help, as a method of scientific hypothesis, favouring the formulation of new problems, varying experiments, just as we do when we acquaint ourselves with a machine which is new to us and which is the hand-work of man".¹² In this instance, the purposive approach, providing the answer to the question "what for", is separated from the ordinary causal approach providing the answer to the question "why". However, there is no contrast here but merely a statement of the fact that the appeal to purpose has yet to provide a full explanation of how it itself has to be explained.

On the strength of this, the purposive approach in general cannot, as a matter of principle, be contrasted to the traditional and the new methods of causal analysis of living systems (historical, experimental, etc.), as we find in the event of its teleological interpretation when this is assumed to be "the most characteristic" method for biology. It has a definite cognitive value only in connection with other methods and within their system, reflecting the overall dynamics and strategy of scientific research, establishing and dividing up the forms of objects and helping to clarify their functional role and origin.

The cognitive potentialities of the purposive approach, interpreted in this broad sense, as I have done above, are naturally not confined to the framework of its application to analysis of living systems. This approach in a sense characterises some general regularity of cognition, because as Marx put it, "man's reflections on the forms of social life, and consequently, also, his scientific analysis of

¹² I.P. Pavlov, Selected Works, Moscow, 1955, p.446. (in Russian).

those forms, take a course directly opposite to that of their actual historical development. He begins, post festum, with the results of the process of development ready to hand before him."¹³

The purposive approach is extensively used for the purposes of description, evaluation and explanation in sociological and economic research, in aesthetics and other fields of knowledge and culture. Its terms can help to interpret many methods of research in mathematics, statistical physics, technology (one need merely mention the construction of idealised objects, extreme principles, etc.).

However, in all these instances, when this or that postulated or actually existing result of a process assumes the form of purpose in subsequent retrospect of the process, there is no question of the "teleological principle" as an alternative to determinism. In contrast to teleology and finalism, scientific research and explanation is achieved here in the light of the many values and diverse orientations of objective interactions in nature and society, of their "thematical orientation", programmed action of instruments but not of results as a whole, the direction towards which as a real or conditional and apparent purpose is brought out only integrally, in the form of a general tendency. The basis of such research and explanation is provided by the dialectico-materialist view of the conception determinism--organic determinism.

¹³ K. Marx, Capital, Vol.I, Moscow, 1965, p.75.

LENIN AND THE HEGELIAN CONCEPTION OF THINKING

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The materialist refashioning of Hegel's dialectics was the point of departure in the emergence of the philosophy of Marxism. Both Marx and Engels considered the Hegelian doctrine as the acme in the development of all preceding philosophy, as a peak from which any further advance called for a radical turn from idealistic dialectics towards dialectical materialism.

What was begun by Marx and Engels was carried on by Lenin, who devoted so much attention to a critical analysis of Hegel's philosophy. A comparison between Hegelian idealism and the idealistic trends dominant in bourgeois philosophy at the end of the 19th and the early years of the 20th century was one of the fundamental subjects that interested Lenin during his work on Hegel's writings and was reflected in his Philosophical Notebooks.

Two problems are brought to the fore in the notes Lenin made in the course of his critical refashioning of the Hegelian system. The first of these is the interrelation between "logic" and "epistemology"; the second was his understanding of dialectics as a science within which alone could be found the theoretical solution to the problem traditionally separated from it in the form of "logic" and the "theory of knowledge". These two intersecting and interlinked problems run through the entire text of Philosophical Note-

books. Of course, the passages quoted denote the line of the development of Lenin's thinking merely in a general way, so that it is very important to reconstruct the line of thinking that led up to the emergence of ultimate formulas (dialectics is the selfsame logic, as well as the theory of knowledge in present-day materialism; these cannot in any way be seen as different sciences; "these are the same thing"; these are not an "aspect" of the matter, but its essence).

Although the Hegelian conception is first and foremost the immediate object of critical analysis registered in Philosophical Notebooks, it would, of course, be wrong to see them only as critical comment to Hegel's works. No doubt, Lenin was interested not so much in Hegel himself as in the actual content of the problems whose urgency continue to this day. It is perfectly natural that the problem of knowledge stands in the foreground in this connection, more precisely, the problem of scientific cognition, which was the hub--the more so with the passage of time--of worldwide philosophical thinking at the end of the 19th and the beginning of the 20th centuries. The first note made in this connection in Philosophical Notebooks: "The theme of logic. To be compared to present-day 'epistemology'"¹ describes the initial principle in whose light Lenin read those pages in Hegel that deal with the question of what logic as a science is all about.

The quotation marks enclosing the word "epistemology" are in no way fortuitous here. That is because the bracketing together of a number of old philosophical problems into a special philosophical science (irrespective of whether the latter is recognised as the sole present-day form of scientific philosophy, or else as only as one of the many departments of philosophy) is a fact of recent origin. The very word "epistemology" (the theory of knowledge) gained currency only towards the end of the 19th century, as the designa-

¹ V.I. Lenin, Collected Works, Vol.38, p.103.

tion of a special science, a specific area of research, which was not distinctly denoted within the classical systems, though it would be patently absurd to assert that cognition in general, and scientific cognition in particular, became the object of special attention only with the emergence of "epistemology".

Epistemology as constituting a separate science was linked both historically and in essence with the extensive spread of neo-Kantianism, which, throughout the final third of the 19th century, became one of the most influential trends in European philosophical thought. What marked neo-Kantianism was not, of course, the discovery of the problem of cognition as focal in philosophy, but that specific form in the posing of this problem which, despite all the differences between the various ramifications of that school, could be reduced to the following:

"The doctrine of knowledge, which explores the conditions thanks to which indisputably existing knowledge becomes possible and, according to these conditions, establishes the borderlines of any kind of knowledge, beyond which there is an area of equally unprovable opinions, is usually called the 'theory of knowledge', or 'epistemology'... Of course, apart from this particular task, the theory of knowledge has the right to set itself other, supplementary tasks. However, if it is to become a science that makes sense, it should first and foremost engage in elucidating the question of the existence or non-existence of the borders of knowledge...."²

The Russian Kantian A. Vvedensky, the author of this definition of "epistemology", provided a precise and clear-cut formulation of the science usually "designated" by the term in the neo-Kantian literature and in all schools that have arisen under its predominant influence. Dozens of similar formulations might be quoted, coming from the classics of

² A.I. Vvedensky, Logic as Part of the Theory of Knowledge, Petrograd, 1923, p.29 (in Russian).

neo-Kantianism such as Rickert, Wundt, Cassirer, and Windelband as well as from representatives of its various offshoots such as Schuppe, Vaihinger and so on. Despite all the various shades and differences, that understanding of the special task pursued by the theory of knowledge (thanks to which alone it can be regarded as a special theory, as a special science) remains invariable in the main thing emphasised in Vvedensky's definition. That task is seen in the establishment of the "borders of cognition"---a boundary which cognition is unable to cross in any circumstances, irrespective of the level achieved by man's cognitive capacities, or by the techniques of scientific research and experimental technology. "The borders of cognition" separate the sphere of what is cognisable in principle from the sphere of what is incognisable in principle. They exist, not because of the restrictedness of human experience in time and space (in which case the extension of the sphere of experience would also broaden the boundaries of cognition, turning them into a line of division between what has already been cognised and what has not yet been cognised but is cognisable in principle) but because of the specific features of the "capacity for cognition" itself, the specific forms of that capacity, i.e., the activity which refashions into "experience" the constantly succeeding subject's states, refashioning them into definitive ideas and into a system of interlinked ideas ("notions"), i.e., into "knowledge".

This distinction between the cognisable (the immanent) and the incognisable (the transcendental) paved the way for the "theory of knowledge" to become individualised as a special science, contrasting itself to "metaphysics" or "ontology". If this distinction--made in its classical form by Kant--is rejected, then it no longer remains necessary to distinguish "epistemology" as a special science, inasmuch as the object which that science can study, as distinct from "metaphysics", disappears.

The Kantian understanding of metaphysics assumes that all human science has always been and will always be merely

a systematised description of events that take place exclusively in our own experience, and that any assertion made by science should be interpreted just as an assertion about what takes place in the sphere of experience, in the sphere of ideas and notions. As soon as science makes so bold as to assert (or deny) anything in the world of "things-in-themselves", it immediately ceases to be a science and turns into "metaphysics". Of course, the reference here is not only to such things as "God", the "immortality of the soul" or "freedom of will", but also to any ideas existing in present-day natural or social sciences. The same also holds true of such ideas as causality and quantity, law-governed pattern and probability, the part and the whole and so on, i.e., of any idea that forms part of scientific knowledge. Therefore, in the Kantian understanding, metaphysics is in no way a specific and individual science that, unlike the "particular" sciences, deals only with the overall and universal "principles of being". Metaphysics is the selfsame physics, the selfsame chemistry or political economy as interpreted as knowledge of things-in-themselves, as knowledge of reality, outside the consciousness of man and mankind.

On this plane, the ideas and laws of physics are in no way different from those of logic. In equal measure both are the forms and laws of the link between phenomena, i.e., things in the way they are given in our own consciousness, in the course of their realisation, perception, and understanding. Logical forms and laws may differ from physical laws only in the degree of their universality, only quantitatively, but never in the object in which they reveal themselves.

Any Kantian understands that logical forms and laws can be established and formulated only in the process of research into actual scientific thinking as those overall schemes and rules which equally obey the thinking of the physicist, the chemist or the economist, inasmuch as there exists no kind of thought which is not the one, the second or the third,

but exists particularly, prior to, outside of and independently of all its own manifestations.

Logical forms and laws, just like the ideas and laws of physics, are schemes of the analysis and synthesis of phenomena given to man in his experience: in contemplation, in representation and in experiment. Logical forms and rules can, therefore, be established and understood only as universal forms and schemes that remain invariable in any sphere of phenomena; in other words, these are forms and laws that are universal in the areas of physical, chemical, biological and economic phenomena, in short, in the "thinkable world in general", that very "world" that is the object of study and thought to the physicist, the chemist, the biologist, the economist and so on.

That the "forms and laws of thought" are merely another designation for the forms and laws of the "thinkable world" itself will not arouse the least doubt in any neo-Kantian (neither in the Humist, Berkeleyan, nor in the Machist); no philosopher has harboured any doubt on that score. The logical (i.e., the universal) forms and schemes of thought processes (theoretical consciousness) are given to the logician only as forms and schemes of the thinkable--cognised and cognisable--world, or, in other words, of the world as depicted by science. In this sense, the expression "the general principles of cognition" are fully equivalent to the expression "the general principles of the world".

That is why it has never occurred to any philosopher to construct two different sciences standing side by side--one of them dealing with the principles of the cognition of the world, the other with the principles of the world as cognised by that science. To any Kantian, and first and foremost to Kant himself, it is obvious that two different sciences are impossible here in principle--this is one and the same science, both in its object (we have one and the same object) and in the make-up of the notions expressing that object (these are the selfsame notions that Kant considers

in his "transcendental logic": the categories of quality, quantity, necessity, substance, causality and so on). Considered as principles of judgements with an objective significance, as schemes of the synthesis of representations in scientific cognition, categories operate as forms of the organisation of the data of experience into a scientific picture of the world.

To Kant, these were indeed "principles of cognition", or, more precisely, of theoretical cognition, universal schemes of linking up representations in the scientific picture of the world.

There is absolutely nothing specifically Kantian or specifically idealistic in this view of categories; it is merely a neatly expressed understanding of the active role played by universal categories (and, in the broader sense, of notions in general) in the process of cognition, the construction of a scientific picture of the world, of a scientific world-outlook. This feature of the Kantian understanding of categories was never subsequently disputed by anyone, neither by Fichte, Hegel, Feuerbach, nor by Marx.

Specific in Kant is something else--a principled and categorical denial of the possibility of building up an integral scientific world-outlook, or, what amounts to the same thing, a denial of science (or the totality of sciences) being able to play the role of a world-outlook.

It was this trend in Kant's thinking that was taken up by the neo-Kantians, who, in different variants, developed the view that science will never be able to create, by its own forces, a "picture of the world" that would meet its own principles and, first and foremost, the supreme principle of any "unity of phenomena in the consciousness"--the principle of banning contradictions in definitions.

The same principles of cognition, which are conditions for the possibility of any scientific synthesis of representations in notion, judgement and inference, i.e., in category, also prove to be the conditions for the impossibility of

achieving a complete synthesis of all scientific representations in a single coherent and non-contradictory picture of the world. This means, in the language of the Kantians, that a world-outlook based on scientific principles--or, more simply, a scientific world-outlook--is impossible in principle. Within a scientific world-outlook--not fortuitously, or because of any lack of information but with the force of necessity inherent in the very nature of thought as expressed in categorical schemes--there always remain contradictions that split up that "integral world-outlook" into fragments which cannot be joined together without a flagrant violation of the supreme principle of all analytical judgments--a ban on any contradiction within scientific definitions that can be linked together in a unity of notions.

There is only one way for man to link together the scattered fragments of a scientific picture of the world in order to obtain a supreme unity (i.e., a world-outlook): he can do that by violating his own supreme principles in these particular points of the synthesis, or, which is the same thing, by turning other--and this time unscientific--schemes of the necessary linkage of representations into principles of synthesis.

What kind of principles are these? They are principles of faith, which, in terms of science, are equally unprovable, and irrefutable postulates and axioms that are accepted exclusively because of an irrational proclivity, a liking, a sense of conscience, and so on and so forth. With the aid of such postulates, which do not come under the jurisdiction of science, a single coherent picture of the world, a world-outlook can be built up.

Inasmuch as a coherent world-outlook has always been an insatiable need of any thinking subject, that world-outlook must blend within itself the principles of scientific cognition and the irrational postulates of faith, whether religious, purely moral, aesthetic or any other.

Hence the Kantian call for a blending of science and faith, of the logical principles of a scientific picture of the world, and irrational (logically unprovable and irrefutable) attitudes that compensate for the impotence inbuilt in the intellect in respect of the achievement of a supreme synthesis of knowledge. Without due account of this point, so focal in all Kantianism, it is quite impossible to understand the meaning of the Kantian posing of the question regarding the relation between logic and the theory of knowledge (epistemology), that posing of the question that Lenin had in mind when he wrote: "The theme of logic. To be compared to present-day 'epistemology'."

Logic as such is interpreted by all Kantians as part of the theory of knowledge; for them the main question in the latter consists in the erection of an insurmountable barrier between the cognisable and the incognisable, the restriction of the sphere of the cognisable to immanent objects, a sphere beyond the confines of which there begins, according to the Kantian doctrine, the transcendental world of "things-in-themselves", i.e., a world completely blocked to scientific understanding. That is why logic and its principles are applicable only and exclusively within the confines of the world in the way it is represented within our own consciousness (individual or collective).

It is the task of logic to provide a rigorous analysis of images already present in the consciousness, i.e., their reduction to simple components, expressed in strictly definite terms, and also the reverse operation: the synthesis or linking together of these simple components into complex systems of definitions (notions, systems of notions and theories), but again according to strictly established rules.

Thinking (as the object of logic) even within the "borders of cognition" as established by the theory of knowledge in general has, in its turn, been assigned a restricted area of application, within the confines of which its rules are lawful and obligatory. However, the laws and rules

of logic are not applicable in respect of images of perception as such, or sensations, ideas and phantoms of the mythologising consciousness—including the idea of God, the immortality of the soul and the like. Of course, these do and should serve as a kind of sieve to prevent all such images of the consciousness from entering scientific knowledge in the capacity of scientific notions. But this is not all. Thought grounded in logic has neither the possibility nor the right to judge of the correctness of these images as such. Consequently, there is not, neither can there be, any rationally grounded and scientifically tested stand in respect of any image of the consciousness, if the latter has arisen prior to and independently of any specifically logical activities of the mind, prior to and outside of science.

The presence of such images is impermissible in science, within its specific borders as established by logic. Beyond those confines, their existence is autonomous, not subject to rule of the intellect or to any notion, and is, therefore, "epistemologically" inviolable. Herein lies the essence of the Kantian stand in the question of the relation between logic and the "theory of knowledge", or epistemology.

In view of the Kantian interpretation of the relation between logic and epistemology, one can readily understand the close attention Lenin devoted to the Hegelian solution of this problem—the relation of thinking (the object of logic) to man's all other cognitive capacities.

In the Hegelian understanding of the question, logic takes in, fully and without the least irrational residue, the entire range of problems of cognition, without leaving outside its confines the images of contemplation or the imagination. It includes their consideration within itself, and does so on the ground that the images of contemplation, ideas and fantasy are nothing but "external" products (realised in sensuously perceived material) of the active force of thinking. This is the selfsame thinking (the object of logic), only reified, not in words, judgements or con-

clusions, but in things that are sensuously contraposed to the individual consciousness (acts, events and so on). Here logic merges totally and without any residue with the theory of knowledge, because all other cognitive abilities are regarded as kinds of thinking, as the same thinking which has not yet achieved an adequate form of expression.

Here we seem to come up against an extreme expression of Hegel's absolute idealism, according to which the whole world, and not merely the "other cognitive capacities" are interpreted as alienated and reified thinking that has not yet arrived at its own self, has not yet returned to within itself. Of course, Lenin as a consistent materialist could not agree with this. However--and this is worthy of note--Lenin formulated his attitude to the Hegelian solution very cautiously:

"In this conception [i.e., in the Hegelian understanding as set forth above--E.I.], logic coincides with the theory of knowledge. This is, in general, a very important question."³

The Kantian understanding of logic as "part of the theory of knowledge" in no way remained an abstract philosophical construction. The Kantian theory of knowledge determined, not something in general but the limits of science's competence in general, of the scientific approach and of judgement in general, leaving beyond the confines of these borders, and calling "transcendental" to logical thinking, i.e., theoretical cognition, the most burning problems of the world-outlook, and declaring as not only permissible but even necessary the union of scientific research and faith, this being the condition for the possibility of a world-outlook in general. It was under the flag of Kantianism that the revisionist stream initiated by E. Bernstein and "K. Schmidt burst into the socialist movement. Here the Kantian theory of knowledge was directly oriented towards a fusion (actually towards a watering down) of "rigorously

³ V.I. Lenin, Collected Works, Vol.38, p.175.

scientific thinking" (according to E. Bernstein, the thinking of Marx and Engels was not rigorously scientific, being debilitated by Hegel's vague dialectics) with "ethical values", with an unprovable and yet irrefutable faith in the transcendental postulates of "the good", "the conscious", "love of one's fellowmen" and "the entire human race", and so on and so forth.

The harm of the Kantian idea, of fusing "science" with a "system of supreme ethical values" lies, in principle, in its having shifted the ideas in the mainstream of the development of theoretical thought, the roads along which a scientific solution to the actual problems of our times can and should be sought.

Inasmuch as attempts were made to develop it, not with the aid of dialectics but of "up-to-date" logical means, Marxian political economy could not but be debased into a superficial classifying description of present-day economic phenomena, i.e., into their absolutely uncritical acceptance, an apologia. Here the road led straight to Karl Renner, with his Theory of the Capitalist Economy, which, in respect of the method of thinking, of the logic of research, was directly oriented towards a vulgar, positivist epistemology. Here is Karl Renner's philosophical credo: "... Marx's Capital, which was written in an epoch far removed from us, one whose mode of thinking and exposition differed from today's and was not carried through to the end, presents ever new difficulties to the reader, with the passage of every decade.... The way in which the German philosophers set forth their ideas has become foreign to us. Marx is rooted in an epoch that was for the most part philosophical. Not only in its description of phenomena but also in theoretical research, present-day science uses the inductive method, not the deductive; it proceeds from the facts of experience as immediately observed, systematises them and then gradually raises them to the degree of abstract notions. To a generation that has become accustomed to thinking and reading in

this way, the first section of Marx's main work presents insurmountable difficulties..."⁴

In fact, this orientation towards the "present epoch of science", the "present-day manner of thinking", has, beginning with E. Bernstein, proved an orientation towards modish idealistic and agnostic interpretations of that "present-day science" and "manner of thinking", an orientation towards a Humist-Berkeleyian and Kantian epistemology. Lenin saw this very clearly. Since the middle of the 19th century, bourgeois philosophy had been openly turning "back to Kant", Hume and Berkeley; in that context, Hegel, despite all his absolute idealism, was more and more clearly seen as the acme in the development of all pre-Marxist philosophy in the area of logic, understood as the theory of the development of scientific cognition.

Lenin frequently returned to such an appraisal of the place and role of Hegelian logic, emphasising that from Hegel the advance could be made only along a single road--that of a materialistic rethinking of his achievements, since Hegel's "absolute" idealism had indeed absolutely exhausted all the possibilities of idealism as a principle of the understanding of thinking, cognition and scientific consciousness. However, only Marx and Engels could follow that road. They revealed the genuine meaning, the "down-to-earth content" of dialectics as Hegel's main achievement: thereby they brought out not only the constructive but also the revolutionarily destructive force of its principles.

This urge to negate became quite obvious as soon as it transpired that the dialectical schemes and categories found by Hegel in the history of the Spirit (i.e., mankind's spiritual culture) were not merely active forms of the construction of the "kingdom of the spirit" but also forms of

⁴ Karl Renner, The Theory of Capitalist Economy (Russian trans.), Moscow, 1926, pp.XVIII-XIX.

people's real activities, forms of the constant renovation and transformation of the world, within which these vital activities are carried on, a world which is its object and material.

An understanding of this decisive circumstance, i.e., the link between the activities of the Spirit and the forms of actual human activities which change the real world--the world of "things-in-themselves"--was the most important forward step that Hegel made in comparison with Kant.

The neo-Kantians and all their followers to this day have unanimously condemned Hegel for his having "impermissibly extended" the very concept of logic including in it, beside the forms and laws of thinking, the totality of the forms and laws of the development of the existing world outside of and prior to man--all of metaphysics, all of ontology.

On this point, too, Lenin resolutely and categorically took the side of Hegel against Kant and Kantianism, which has sinned in the reverse direction by psychologising, without exception and without any remainder, all the forms and laws of the real world as cognised by man, interpreting them as pure forms of the mind, as transcendental schemes in the linking together of ideas into notions and nothing more.

Why was it that Lenin, who waged a struggle against Hegel's absolute idealism, nevertheless sided with him in that very point at which that idealism seems to become absolute. After all, it was an understanding of logic as a science whose principles embrace, not only human thinking, but also the real world outside of man's consciousness that was linked with the "pan-logicism" of his philosophy, with an understanding of the forms and laws of the real world as "alienated" forms of thinking, and the latter itself as an absolute force and power that organises the world.

The gist of the matter is that the Hegelian understanding of "thinking" as an active force that transforms and even creates the world outside of man's consciousness gave

an idealistically inverted expression to the real circumstance towards which Kant was always tragically blind and from which neo-Kantianism turned away quite consciously. That circumstance, expressed in the Hegelian definition of thinking (and thereby of logic as a science and of its subject), consists in the following simple fact: "thinking" as a subjectively human mental ability is effected, not only as a series of successive "mental conditions" but also as real actions, i.e., man's practical operations changing the form and location of things outside of his consciousness. In this respect Hegel viewed things infinitely more realistically and soberly than Kant and Kantianism.

Hegel was and remains the only pre-Marxian thinker who consciously brought practice into logic as a criterion of truth, a criterion of the correctness of operations carried out by man in the sphere of the verbo-symbolic explanations of his mental states.

Hegel identified logic with "epistemology" for the reason that man's practice--the senso-object realisation of the aims of the Spirit in natural material--is introduced as a phase in the logical process, is regarded as thinking in its external revelation, in the course of the verification of its results through direct contact with "things-in-themselves", with things outside of man's consciousness and will.

Lenin was very thorough in following up the development of Hegel's thinking in this direction. "That is, the practice of man and of mankind is the test, the criterion, of the objectivity of cognition. Is that Hegel's idea? It is necessary to return to this."⁵

Returning to the matter somewhat later, Lenin made the following fully categorical statement: "... Undoubtedly, in Hegel, practice serves as a link in the analysis of the process of cognition, and indeed as the transition to

⁵ V.I. Lenin, Collected Works, Vol.38, p.211.

objective ('absolute', according to Hegel) truth. Marx, consequently, clearly sides with Hegel in introducing the criterion of practice into the theory of knowledge: see the Theses on Feuerbach."⁶

Operating as a "practical act", thinking brings things themselves into its movement, outside of human consciousness; in the course of that act, it appears that "things-in-themselves" are subordinated to the dictate of thinking (thinking man) and obediently move and change in accordance with laws and schemes dictated by that thinking. It is this that proves that logical schemes are such according to which, not only the Spirit but also the world of "things-in-themselves" move..

Consequently, logic proves to be the theory of knowledge of such things as well, and not only the theory of the "self-knowledge" of the Spirit. That is why things in their universal definitions are presented in logic as things, included in the logical process, drawn into it and orbiting according to schemes of thinking.

It is for this reason that logic proves, not only the science of purely "transcendental-psychological" schemes of the thinking process but also (and even primarily) of schemes of thinking which, as borne out by practice, are at the same time schemes of the movement of things outside of the individual's consciousness and will. That is what Hegel's thought consists in.

Here is how Lenin formulated the "rational core" in Hegel's conception of the object of logic as a science: "Logic is the science, not of external forms of thought but of the laws of development 'of all material, natural and spiritual things', i.e., of the development of the entire content of the world and of its cognition, i.e., the sum-total, the conclusion of the History of knowledge of the world."⁷

⁶ Ibid., p.212.

⁷ Ibid., pp.92-93.

There is no such formulation, no such understanding, of the object of logic in Hegel himself. From the orthodox Hegelian point of view, this definition lacks precision, since Hegel himself did not, and could not, make mention of the laws of the development of material things as such, and, consequently, of the laws of development common both to the world of material and that of spiritual things. According to Hegel, it is not things that "develop" but only their notions, things in the thinking, in the way they are represented in the logical process.

Therefore, the formulation just mentioned is not simply a rewording of Hegel's thought but a materialistically reworked Hegel's thought; in other words, the thought expressed by the German thinker is represented in its rational content, which was not very clear to Hegel.

The difference between Hegel's and Lenin's formulations is one of principle, so that it is deeply erroneous to think that the definition of logic as the science of the laws of development of "all material and spiritual things" is simply a "thought of Hegel's", simply conveyed or even simply cited by Lenin. This thought belongs to Lenin himself, and he formulated it in the course of his critical reading of Hegel's texts.

Logic is Hegel's theory of knowledge because that logic (the science of thinking) is deduced by him from research into the history of the Spirit's cognition of itself, and thereby of the world of natural things, inasmuch as those things are regarded as moments in the logical process, as schemes of thinking, "alienated" into natural material.

Logic is Marxism's theory of knowledge, but already for another reason, because the "forms of the Spirit's activities" themselves--the categories and schemes of logic--are deduced, according to Lenin, from a study of the history of mankind's cognition and practice, i.e., from a process in which thinking man (more precisely, mankind) cognises and transforms the material world. From this viewpoint, logic

cannot be anything else but a theory that ascertains the universal schemes of the development of social man's cognition and transformation of the material world. As such logic is the theory of knowledge.

According to Lenin, logic and the theory of knowledge are in no way two distinct sciences. From this point of view, there are even less grounds to determine logic as part of the theory of knowledge, because such an understanding of logic inescapably leads to its being converted into a department of psychology, which is called upon to study man's "other cognitive capacities": contemplation, perception, memory, imagination and also "thinking", regarded here as a "cognitive ability" peculiar to the individual.

In the field of logic, thinking should never be regarded as follows: contraposed to it as its "otherness" are not the other "cognitive capacities" but its object--objective reality in the most precise and broad sense of the words. That is why the categories and laws (schemes) of the development of the objective world in general as cognised in the course of the age-old development of scientific culture and verified by man's social practice, form part of the logical definitions of thinking; such schemes are common both to natural and to socio-historical development. Reflected in social consciousness--in mankind's spiritual culture--these universal schemes of "any development" perform the role of active logical forms of the operation of thinking.

In this kind of understanding, however, logic (i.e., the materialist theory of knowledge) merges with dialectics, in the very definition of its object and tasks. Again, these are not two different, if closely interlinked, sciences, but one and the same science, both in its object and in the composition of its notions. This is not an "aspect" of the matter but its "essence", as Lenin emphasised.

Logic (the theory of knowledge) has the same "relation" to dialectics. According to Lenin, this is a relation of complete identity, of complete coincidence in the object and

make-up of the categories reflecting that object. Dialectics has no object distinct from that of the theory of knowledge (logic), in just the same way as logic (the theory of knowledge) has no object of study that is distinct from that of dialectics, from universal forms and laws of development in general, as reflected in the consciousness as logical forms and laws of thinking through definitions of categories.

That is why such categories as "the schemes of the synthesis of the data of experience in notions" have a quite objective significance; the same kind of significance also attaches to "experience" as reworked with their aid, i.e., science, a scientific picture of the world, the scientific world-outlook.

Kantians believe that a world-outlook should not fail to include a non-scientific component--ethical, moral, irrationally aesthetic or frankly religious--in other words, some present-day variety of Kant's "practical reason". In this point too, Hegel, as Lenin kept on underlining, has proved to be an ally of present-day materialism in its struggle against Kantianism, Humanism and Berkelianism, and thereby against those philosophical constructions that underlie all "present-day" bourgeois conceptions of logic, epistemology, and dialectics.

"Dialectics is the theory of knowledge of (Hegel and) Marxism. This is the 'aspect' of the matter (it is not 'an aspect' but the essence of the matter) to which Plekhanov, not to speak of other Marxists, paid no attention."⁸ This is what Lenin wrote in his On the Question of Dialectics, in which he summed up his work on the materialistically critical reworking of Hegel's conception of logic.

⁸ Ibid., p.362.

ADVANCE REFLECTION OF REALITY AT THE LEVEL
OF HUMAN COGNITION

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Forms of Reflection at the Level of Living
Nature and Social Life

Two basic forms of reflection of reality--the biological and the social--may be identified at the level of living nature. The biological form, for its part, includes reflection at the prepsychic and psychic levels.¹

The social form of reflection, which is specific to man as a social being, has two interconnected aspects. By means of abstraction we are able to identify the cognitive aspect connected with the acquisition of that form of social experience which constitutes science or which lies at the basis of the formation of science, and the aspect connected with a reflection of reality as diverse forms of social consciousness. This means that we draw a distinction between reflection as cognition and reflection which is realised in the forms of social consciousness.

Cognition includes two levels (two stages, with the historical approach) of reflection of reality: cognition at the level of every-day life (prescientific cognition) and cognition at the level of science (scientific cognition). In

¹ For a circumstantial analysis of these forms of reflection see: P.K. Anokhin, "The Psychic Form of Reflection of Reality" in The Leninist Theory of Reflection and the Present, Sofia, 1969, pp.109-139.

the scientific cognition of reality a distinction is usually drawn between the pretheoretical and theoretical levels (in the experimental sciences, the pretheoretical level is usually characterised as the empirical level of cognition).

Reflection at the level of cognition is the reproduction of things in their objective properties and relations with each other (regardless of whether the latter are of immediate importance or are indifferent for the preservation of the life of the subject). This reproduction occurs on the basis of:

a) practical activity and collective (and not only personal, individual) experience, which is coded by means of artificial sign systems and which is assimilated in the course of training and education;

b) the use of methods of mental activity ensuring truly boundless possibilities for the advance reflection of reality.

The information about the world acquired at this level of reflection usually lends itself to interpretation which makes it possible to apply to it truth evaluations and to carry out its verification by means of its immediate or mediated comparison with reality.

Reflection at the level of the forms of social consciousness is reproduction in these forms of the moods, subject's attitudes, ideological tenets, and will, of his assessments of phenomena and aspects of social life, characteristic of him as a representative of this or that class or any smaller social groups. This or that content of the forms of social consciousness may be a more or less adequate or inadequate reproduction of the interests of social classes and groups, may or may not correspond to the objective tendencies of the social development and may, in that sense, allow truth evaluations. At this point we are in a position to identify that which is common to all the above-mentioned forms of reflection so as to formulate a general level of reflection at the level of living nature.

First, in all these forms it is reality that is reproduced. In some instances, this reproduction may occur on the basis of physico-chemical processes occurring in the protoplasm of the cell, in others, at the level of higher nervous activity; in some instances the adequate reproduction by the organism of reality is evidenced by the purposefulness of its behaviour and adaptation to the conditions of the habitat, and in others, by the application of scientific theory in practice.

Second, at all these levels reflection is of the advance type. This type of reflection occurs also when glycerine is formed in the body of the parasitic wasp with the onset of the first few cold days, a process which enables the wasp subsequently to survive during the winter cold, and also when the general theory of relativity is formulated.

Third, at some of its stages the process of reflection implies immediate interaction, contact between the reflecting organism and the reflected object, and fixation of or reckoning with by the organism of the characteristics of the reflected object, its similarities and distinctions in the first place. At the biological level, the reproduction of various ecological factors necessarily implies their immediate contact with the living organism; the results of reflection here are immediately and causally determined by the impact of the environment. At the level of cognition, however, its results, generally speaking, are only eventually determined causally by the immediate influence of the object on the subject.

Fourth, the process of reflection always implies the use of code semiotic systems. At the biological form level these are no more than natural. (cf. the coding of the hereditary properties of organism in DNA molecules, and the recoding of electromagnetic and sound oscillations into nervous pulses); at the social form level to their number are added new man-made code systems (for instance, natural language, artificial science languages).

Thus, reflection at the living level is advance reflection of reality by the organism, implying at some point of its formation direct contact between the organism and material objects and occurring on the basis of code semiotic systems.

General Characteristic of Cognition as Reflection
of Reality Possessing the Property of Advance
Reflection

There are no rigid boundaries between the prescientific (every-day) and the scientific levels of cognition; what is more, these have constantly changed in the course of history.

The most developed form of cognition at the former level consists of receptive rules based on a generalisation of empirical experience; initially, they contained descriptions of some algorithms for the solution of problems of importance primarily for satisfying man's immediate requirements. These rules prescribed that man should perform a succession of acts with some initial objects ensuring the receipt of the desired results. They contained, for instance, recommendations for obtaining fire, making this or that tool, etc.

In contrast to natural laws described by science and reflecting relations between objects of the material world existing independently of man, receptive rules were in the nature of prescriptions for man and were a generalisation of those of his "happy" discoveries and actions performed by him in the process of his practical activity.

Under developed scientific cognition we make equally extensive use of receptive rules and not only in the household but also in the technology of production, in medicine, etc.

At the stage of prescientific cognition, man learned to register and use in the sphere of his limited experience the invariants of successive changes in the surrounding environ-

ment, and to identify the stable connections in the succession of events. Naturally, man also made use of complex mental activity and abstract and idealised objects. This experience, fixed in language, was steadily expanded and deepened, and did not disappear with his death, as it did among animals. It provided the basis for formulating fairly reliable hypotheses about the events and facts which man did not immediately perceive at that moment. In other words, the immediate perception of events that were yet to come was anticipated in man by the existence of a sufficiently well-grounded expectation of their occurrence, based on an analysis of acquired experience. That is the essence of the advance nature of reflection of reality at the level of prescientific cognition.

Let us now consider in the most general terms the specific characteristics of scientific cognition as a special form of ideal advance reflection of reality by man.

Here are some of them.

1. The subject of research becomes not only objects of direct importance for man's life. The range of objects being studied is greatly extended. For instance, man begins to study the properties of objects which cannot be discovered in natural conditions so as to be made the object of immediate study. He resorts to abstractions to discover and study properties of objects which, in principle, cannot be the subject of immediate perception. The process of cognition itself and its components also become the subject of study.

In the process of scientific cognition man does not merely register what he has directly observed (including the invariant sequences of events), but develops forward-looking hypotheses also about future events changing uniformly under changing conditions, and about the substance of what is given in the present. Predictions about the behaviour of this or that object in the future turns out to be a function of the degree to which that object has been studied. The

importance of mental methods relating to the sphere of discursive thinking become substantially more important as compared with memory, attention and the habits used in mastering social experience.

2. The development of science itself creates vast possibilities for advance reflection of reality. Let us confine ourselves in this context to only a few examples.

Any law of mathematical natural science, recorded in the language of mathematics, makes it possible on the basis of limited information, obtained by means of direct measurements, to get new information about the objects being studied in a mediated manner, that is, by means of calculations. The practice of the immediate measurement of magnitudes is replaced by mental activity, with the results of the calculations considered true (with a given degree of approximation) so long as the initial information and the law applied are true.

Science and its internal laws of development create the conditions in which analysis and comparison of equations and the physical magnitudes calculated by means of these make it possible to formulate well-grounded hypotheses about the existence of objects and their properties which are not given immediately (cf. discoveries in the physics of the microworld by means of mathematical hypotheses).

When strictly structured, scientific theories (cf. mathematical axiomatic theories) make it possible to obtain with the use of the rules of logic new objects, and to demonstrate theorems on the properties of primary objects and properties of new objects. This also opens up theorems which had not been known at the level of pretheoretical development of science. Many of these turn out to be unexpected, containing very much information and even contradicting the intuitive convictions of specialists (cf. Gödel's theorem of the incompleteness of formalised arithmetic).

By introducing abstract and idealised objects into scientific theories we not only simplify the situation being studied but also provide science with vast heuristic potential.

The remarkable thing is that the use of abstraction of the highest level and idealisation (provided these are reasonable), the presentation of the material objects being studied in abstract and idealised form helps not only to discover the laws of nature but also to bring out the possibilities for the technical application of the regularities being discovered. This, in effect, shows that "all scientific (correct, serious, not absurd) abstractions reflect nature more deeply, truly and completely."²

3. The advance nature of reflection of reality is very clearly expressed when we seek to gain a knowledge of not what is given and what can always be reproduced, or is rhythmically, cyclically reproduced the natural way (in such instances we abstract ourselves from the parameter of historical time by means of which the new and unique that arises in the process of development of the material object is established, and are content with astronomical time), but that which does not allow abstraction from historical time. Thus, in the diachronic study of social phenomena the parameter of historical time is an essential part of the description. Hypotheses about the future society are unique if they apply to the future of mankind as a whole, and are evidence of the great power of the advance projection properties of the human mind.

Thus, in the process of advance reflection at the level of science man gains a knowledge of objects, their properties and relationships between them, structuring reasonable hypotheses about their existence and their character (regardless of whether these existed in the past, exist in the present or are mere potentials in the future) even if these

² V.I. Lenin, Collected Works, Moscow, Vol.38, p.171.

are not or cannot in principle be an object of perception. Let us add that the volume of the objects of which a knowledge is gained through advance reflection tends substantially to increase; the range of instruments by means of which advance reflection is effected likewise tends to increase in scope.

Logic and Reflection

Scientific knowledge is the most perfect form of advance reflection of reality. The truly boundless potential of such reflection, which is inherent in scientific knowledge, largely depends on the extensive use in science of logical operations and procedures. Logic makes it possible to obtain new knowledge about an object mediately, by structuring a series of conclusions and demonstrations, thereby making it possible to minimise the immediate contacts with the object and influence on it in the process of obtaining knowledge.

Thus, the use of induction even in its simplest forms (incomplete induction through simple enumeration) gives ground for the extrapolation of knowledge about some elements of a class onto those of its elements which are not objects of immediate reflection and, consequently (in accordance with my definition), for advance reflection of reality.

By making use of the rules of deduction as rules of demonstration, we cannot obtain in the conclusion (in the general instance) more reliable knowledge than the knowledge contained in the premises. Insofar as the initial assumption in the deductive sciences (I have in mind the substantial disciplines) are simply accepted without strict formal proof, the demonstrated propositions (theorems) are substantially true to no greater extent than the axioms.

When the axioms or premises do not arouse any doubt, we are in a position to use deduction to obtain important new and true results not earlier known.

However, even when the premises have the character of clearly expressed hypotheses, we are able to apply logic as a means of advance reflection of reality and mentally "play through" various hypothetical situations, weakening our premises to a corresponding extent. Here, description of the hypothetical situation will be effected on the basis of true judgement resting on the basic deduction principle ("theorem of deduction").

Now and again (for instance, in establishing the truth of this or that proposition) advance reflection is also effected through the introduction of patently false propositions, which are, however, subsequently eliminated (cf. demonstration by the rule of contraries). We make use of various mental methods to shape abstract and idealised objects which are then included in this or that scientific theory.

The remarkable thing is that having performed the abstraction of identification with respect to some aggregation of objects we are then able to demonstrate about these certain theorems for individual elements of the aggregation, relying in the process only on the properties used to carry out the generalisation. In that case, the aggregation being studied can be infinite. What has been said above follows from Locke's logical rule, which could be interpreted as follows: if any fixed element a of the class being studied turns out to be the property P, that property belongs to all the elements of that class.

Let us now consider the question of substantiating the introduction into science of high-level abstractions and idealised objects, which are powerful and effective instruments of advance reflection of reality. What is the criterion of the rationality and correctness of abstractions? Why is it possible to introduce into science idealised objects like "point", as something that has no parts or extension (such objects are known not to exist in material reality), like "material point" (as something that has no extension and no mass) but not abstractions like "god"?

Questions of this kind are at the root of the contemporary debate about universals, about the status of universals (abstract and idealised objects) and the possibility of their use in science.

The usual contrast of concepts in logic is between those of Platonism and nominalism, with the question of the extent to which ontological assumptions may be made being usually discussed only at the level of logical semantics. A typical instance of the solution of the problem of the existence of objects serving as a basis for the adoption of a corresponding language and for the interpretation of formalised languages in logic could be the criterion for the existence formulated by Quine: to exist means to be a value of a quantified variable. This thesis does not deal with the actual existence of objects beyond the limits of theory but with the acceptance of a corresponding universum.

Consequently, the debate between present-day Platonism and nominalism is over the acceptance of some systems of objects and a corresponding language at the level of intra-theoretical considerations.

Classical mathematics, adopting the standpoint of Platonism in its different variants, rely on the outstanding successes of mathematics, which the latter owes to the application of the methods of set theory, its concepts, results and interpretations in geometry and mathematical analysis of methods.

An impetus to the emergence of neoconceptualistic and neonominalistic conceptions in mathematics and logic must have been given by the discovery of antinomies in Kantor's theory of sets, antinomies bearing on its fundamental concepts. The critique of concepts in the theory of sets in mathematics has ultimately produced extreme nominalistic standpoints, in accordance with which universals are nothing but "façons de parler" or "manners of speech" (cf. Goodman's

view and his statement that he has nothing against sets, but cannot understand the meaning of a set of anything).³

The spread and establishment of conceptualistic and nominalistic conceptions in mathematics and logic were, I think, also promoted by other circumstances, such as the following:

1. Felix Klein⁴ stressed that the history of mathematics has periods of creative development and critical periods. In the former periods, the requirement of strictness recedes into the background, and in the critical periods begins to play the main role. While Klein may have exaggerated the contrast between these periods, the problems of mathematical strictness have a highly important role to play in works on the principles of mathematics, for the great edifice of mathematical science needs to be structured on a sound foundation. The problems of simplicity, naturalness and intuitive clarity also acquire much importance in the principles of mathematics. The discovery of antinomies in Kantor's set theory has produced doubts about whether it can serve as a basis for solving the problem of substantiating mathematical theories. Simultaneously, doubts have appeared about the general usefulness for such purposes of theories operating with abstractions of such a high level as set theory. Besides, it is well known that in set theory, concepts which are simpler and intuitively more clear have to be explained by means of more complex and intuitively less clear concepts (cf. the genesis of a natural series of numbers according to Frege-Russel and of the empty set).

2. Considering the greatly enhanced role of applied mathematics at the present time, and the solution of mathematical problems by means of computers, mathematical ideas of finitism, constructivism and effective verifiability natu-

³ Quoted in A. Fraenkel and Y. Bar-Hillel, Foundations of Set Theory, Amsterdam, 1958.

⁴ F. Klein, Vorlesungen über die Entwicklung der Mathematik im 19. Jahrhundert, Part I, Berlin, 1926.

rally come to the fore (for instance, under no circumstances can a machine effect the rearrangement of a natural series, or an abstraction of natural infinity).

3. Some extreme advocates of nominalism in logic and mathematics must also have been influenced by neopositivist philosophy in its most radical versions.

In the light of the philosophy of dialectical materialism, generally speaking, the use of abstractions (including high-level abstractions) and idealisation is quite acceptable in the most diverse sciences. This is borne out by the experience in the formation and development of all sciences. The task is merely to show that the use of various abstractions and idealisations (universals) is justified in science. I shall try here to formulate the most general rules for substantiating the use of universals in science.⁵ These are rules (in the broad methodological sense of the word) for introducing and eliminating abstractions and idealisations (universals). We divide these into two classes. The first class of rules relate to the solution of the internal problems of science. The second class implies transition beyond the boundaries of this or that science into the sphere of other sciences and the need to bring out the relation to reality of this or that scientific theory and its components. These rules will be formulated separately for the logico-mathematical and the natural sciences.

Here are some examples of rules of introduction for the logico-mathematical sciences:

1) the rule for introducing abstract and idealised objects (for instance, sets, predicates, functions) by means of explicit definitions ($Dfd=Dfn$).

2) The rule for introducing objects (including high-level abstractions) by means of the ϵ -operator (epsilon-operator).

⁵ In application to mathematics, such rules were formulated by S.A. Janovska (see The Foundation of Statement and Decision, Warszawa, 1965, pp.171-177)

3) The rules for introducing objects by means of implicit axiomatic definitions.

4) The introduction of objects by means of implicit recursive definitions.

5) The rules for introducing abstractions through descriptions of modes of their formation both within developing theory and outside its framework (cf. formation of the concepts of imaginary and natural numbers).

Some of these rules introduce objects only within the limits of a theory (for instance, rules 2 and 4); some of these may be used, however, on the pretheoretical level as well.

Apart from the rules of introduction, some of these rules also contain rules of elimination (for instance, rules 1, 4, and 5), while others are only rules of introduction.

Here are some examples of rules of elimination for the logico-mathematical disciplines:

1) The rule for eliminating objects introduced in accordance with the scheme $Dfd=Dfn$ through a substitution of Dfn for Dfd and an eventual substitution for Dfd of a combination of objects corresponding to the terms of the minimum vocabulary of the theory.

2) The rule for eliminating objects introduced by means of the Σ -operator on the basis of a demonstration of their existence or on the basis of a demonstration of Hilbert's theorem.

3) The rule for eliminating objects introduced by means of a system of axioms, by means of structuring a corresponding model (standard or nonstandard), something that is frequently connected with transition from consideration of a system of objects of any nature to consideration of concrete specified systems of objects.

4) The rule for eliminating objects (functions and predicates) introduced recursively, by reducing them to calculated values.

5) The rule for elimination by means of description, the formation of abstractions beyond the framework of a given theory.

6) The rule for elimination connected with the use of the corresponding theory for solving scientific and practical problems arising outside its framework.

7) The rule for elimination based on a lowering of the level of abstractions by introducing them into the context of variables (this is the way to reduce the level of abstractions introduced by the operator of functional abstraction λ , by means of the operation of application).

Here are some brief explanations for some of the rules of elimination.

If there are rules of elimination for some contextual implicit definitions (thus, when solving equations in accordance with a definite algorithm, we determine the value of the unknowns satisfying these, thereby transforming the implicit definitions into explicit ones), there are no such rules for axiomatic systems (see Rule 3). For these we find a model which could be structured from different kinds of objects.

Rule 4 includes the following restriction: in the general instance, the function being calculated is not everywhere a definite one and, consequently, one that is eliminated in all the contexts (for all the values of its variables).

Rule 5 is very essential for substantiating a series of abstractions. The point is that many abstractions and concepts have arisen at a substantive-intuitive level even before the formation of the corresponding theories and have been successfully applied in practice. An analysis of the modes of their formation may suggest to the scientist which of the concepts and abstractions that have been used in the

process could be retained at the level of structuring scientific theory.

Rule 6, I think, is the fundamental one. If a theory and its abstractions have been successfully applied for solving the problems of another, less abstract theory, and one more immediately connected with reality and material practice, the level of abstractions tends to be lowered and these could be given a natural, material interpretation. Where a theory is directly applied in technical development and the technology of production, the abstractions applied to it are eliminated in the literal sense. In the latter instance, abstractions, like points, which have no dimension are replaced by material objects with three dimensions.

The rules for introduction and elimination are specified in mathematical logic (cf. Gentzen's natural calculus, Church's λ -conversion calculuses).

Similar rules could be formulated for the natural sciences. Let us look at only one important rule for introduction. The formulation of many physical theories implies the introduction into their make-up of idealised objects, like inertia, the body with absolute elasticity, the ideal gas, etc.

The rules for introducing idealised objects of this kind implies the existence of some mental experiment connected with the operation of marginal transition. Thus, by consistently setting a body in motion we can reduce the external impacts on it on every successive occasion. We find that the smaller the external impacts, the greater the path the body will travel.⁶

We can imagine a situation in which the external influences are reduced to zero. In that case, the body will move infinitely and also uniformly and in a straight line

⁶ A. Einstein and L. Infeld, The Evolution of Physics, Cambridge, 1938, pp.6-8.

(unless it is at rest). This is the ground for introducing an idealised object like inertia.

The process of idealisation described above could be determined as follows:

Idealisation is a mental process consisting of the following stages:

1. By modifying some of the conditions in which the object being studied is situated, we make their effect gradually decline (sometimes correspondingly increase).
2. We discover in the process that some properties of the object also tend uniformly to change.
3. Assuming that the effect of the conditions on the object have been reduced to zero or have reached some fixed value, we effect a mental switch to some marginal case and so to some idealised object.

This definition is the rule for the introduction for a given class of idealised objects.

To the rules of introduction may also be referred various forms of generalised experiments, rules of interpretation, etc. The basic rules for elimination here will be the rules for applying theory to practice, the rules ensuring the coincidence of formula-based calculations and direct measurements, the rules ensuring the confirmability of deductions from theory in experimental and measuring activity, etc.

The use of rules connected with transition beyond the limits of closed theories convinces us that abstractions and idealisations are the results of a complex and contradictory reflection of reality, for which there are only remote prototypes in the real world. Such prototypes will be found even for such an abstract and idealised object as the material point. "If we turn our attention only to the movement of the centre of gravity, we shall notice that it does not in any way depend on the density in which the material is arranged, or the form of the body, but only on the quanti-

ty of the material in the body. The centre of gravity moves in such a way as if the mass of the whole body were concentrated in it alone; thus, in it we see something like a real embodiment of the material point."⁷

A. Mostowski has correctly stressed that the source and the ultimate raison d'être of the concept of number, both natural and real, is experience and practical applicability.⁸

Let us note that the elimination of abstractions and idealisations cannot be carried out in any absolute sense or in all the contexts in which they occur. If that were so, it would mean that in science we operate with concepts which we could in principle dispense with.

In the light of this analysis, incidentally, it becomes clear that abstractions like "god" cannot be used in science (they are irrational and unwarranted): for these abstractions it is possible to formulate only the rules of introduction, for instance, by means of explicit definitions (which is exactly what theologians do), but it is impossible to formulate any reasonable rules of elimination at the scientific level, rules that would, moreover, effect their elimination beyond the limits of any "theories" and "conceptions". The latter requirement is mandatory because the abstraction "god" arose in the minds of men before the emergence of any "theories" and "conceptions" of god.

Present-day nominalism has launched a crusade against universals, which entails a substantial restructuring of science.

The weakness of nominalism consists in the fact that up to now it has failed to produce a natural and satisfactory translation of many scientific propositions into the

⁷ N.E. Zhukovsky, Theoretical Mechanics, Moscow-Leningrad, 1952, p.12 (in Russian).

⁸ A. Mostowski, "The Present State of Investigations on the Foundations of Mathematics", Rozprawy Matematyczne IX, Warszawa, 1955, p.16.

language of nominalism (for instance, propositions of the type: "The number of 'a' objects is greater than the number of 'b' objects"; "There are more dogs than cats")⁹ and also in the fact that nominalistic language is much too complex in the sense of being cumbersome, so that its adoption becomes a brake on the development of science, depriving science of its powerful heuristic potential. One agrees with Church, who says that the expulsion of universals from science would result in a situation in which theory is intolerably complicated, if at all possible.¹⁰ This is borne out by some fundamental considerations of a scientific and methodological character.

Universals, that is, abstract and idealised objects are an important element in the arsenal of scientific instruments in advance reflection of reality. Among these we find "ideal elements" (Hilbert's expression), which have a purely operative meaning. It is on the basis of abstractions and idealisations in the application of the use of the rules of logic, as I have shown, that man is enabled to "play through" in his mind, in a relatively simple and accessible form, all kinds of situations before he has translated them into practice or even recorded graphically. To expel universals from science would mean depriving it of its powerful heuristic potential.

What has been said does not, of course, imply that analysis of science in accordance with nominalistic propositions is useless. Such analyses at "critical" periods in the development of science make it possible not merely to enhance the strictness of theory, but also to bring out the constructive and effectively verifiable substance of insufficiently constructive theories.

⁹ L. Genkin, "Nominalistic Analysis of Mathematical Language", Mathematical Logic and Its Applications, Moscow, 1965, pp.216-224 (in Russian).

¹⁰ A. Church, "Propositions and Sentences", The Problem of Universals, Notre Dame, Indiana, 1956, p.9.

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